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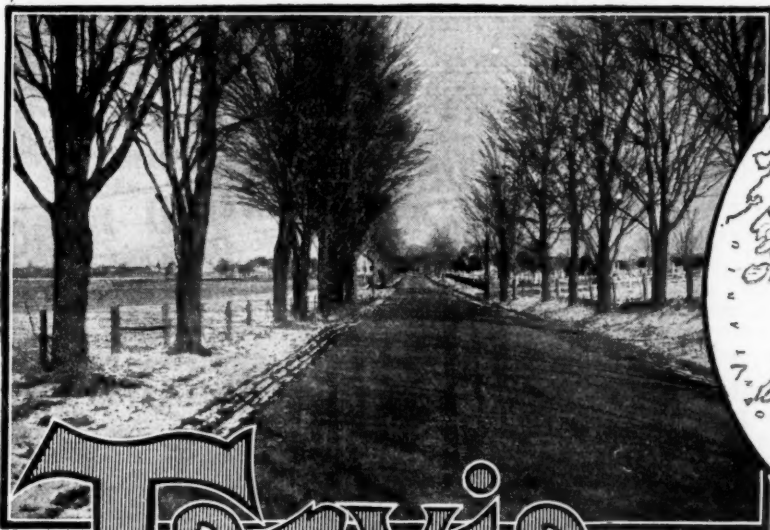
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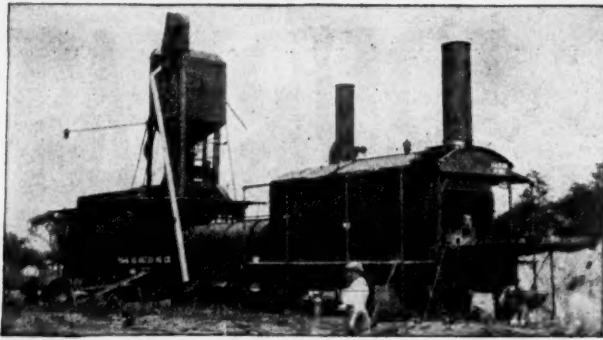
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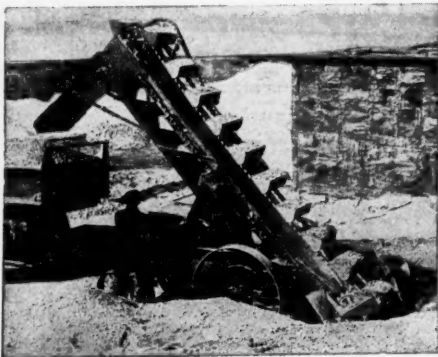
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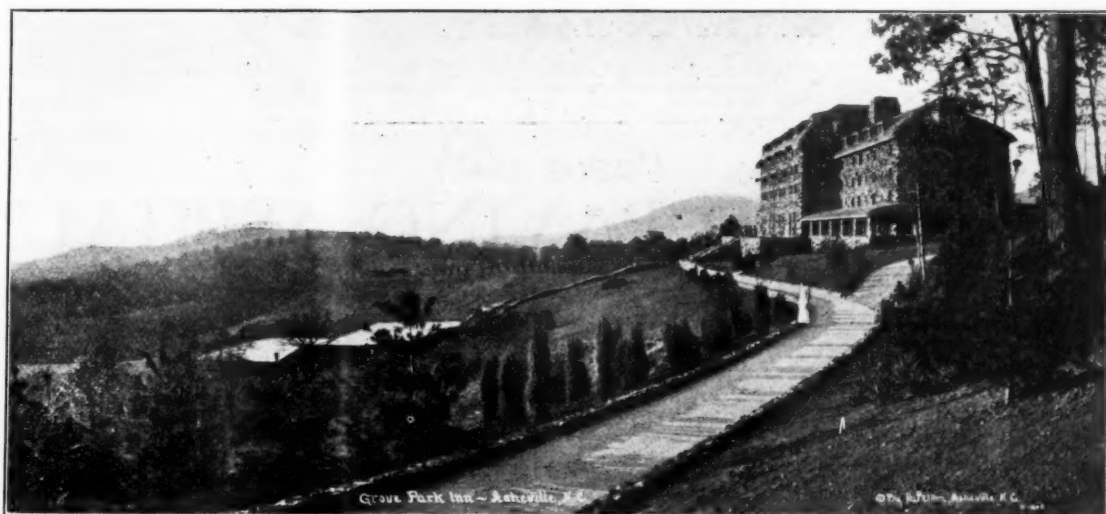
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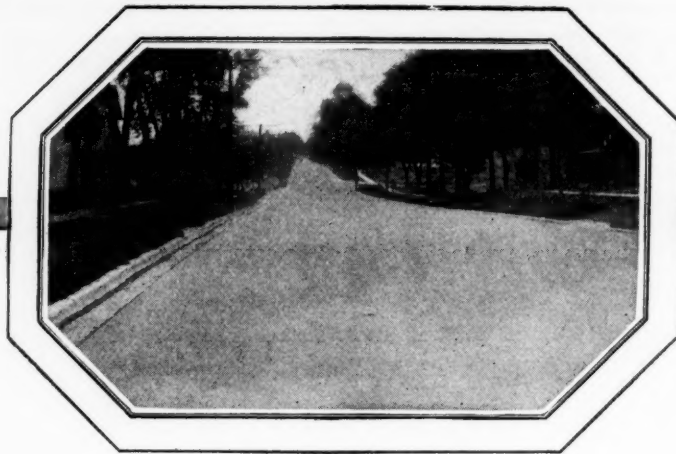
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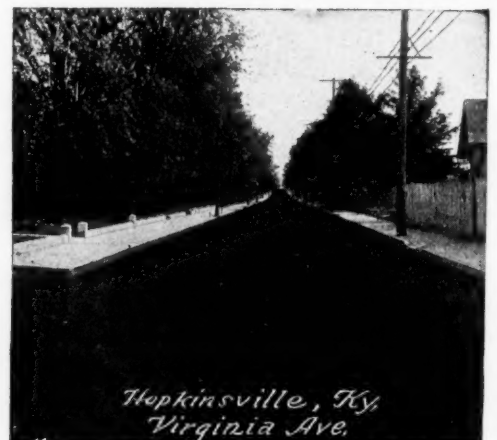
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HENS AS ROAD BUILDERS.

A novel idea is reported from Howell County, Missouri. This is no less than looking to the hens to pay off the road bonds by means of the eggs they lay. In one voting district a "Hen Club" was formed, based on the calculation that if each woman in the district would raise three extra hens the additional eggs so obtained would bring in enough money to pay all taxes occasioned by the road bonds. That looked so easy (to the men voters, at least) that the bond issue was carried in that district by a vote of 50 to 1.

If eggs sold at the store brought the farmer's wife 48 cents a dozen, three a day would pay four per cent interest on nearly \$1,100. The idea of the possibilities of small daily or weekly sums could be used to advantage in advocating many kinds of public improvements. The possibility of obtaining an abundant supply of water by merely turning a faucet instead of going to the pump or well in all kinds of weather, by day or by night, ought to be worth five cents a day to a family (without considering the greater safety to health). But this sum paid by each family in a town of 10,000 population would furnish the interest on the cost of a house connection and simple plumbing for each house and on more than \$500,000 to be spent in building a water works.

CENTRAL MIXING PLANT VERSUS PAVING MIXER.

In the July 5th issue of Municipal Journal was described a concrete road construction job where the concrete is mixed at a central station and hauled by motor truck to the road. This method of construction is a comparatively recent one and gives considerable promise for concrete road construction under certain conditions. There are many points in its favor, where conditions are such that it can be used at all: The labor force is somewhat reduced; work can be carried on at the most favorable location, thus giving great flexibility; the problems of aggregate supply are greatly reduced and stoppages due to the lack of sand or stone on the right-of-way are diminished; one handling of the aggregates is done away with; no special machinery is needed for the work.

But all the advantages are not on one side. There is the added weight of the water to be hauled, at least ten per cent; it is difficult to maintain at all times just the force of motor trucks that it is most economical to operate under the most favorable conditions, though the motor trucks may, of course, be replaced by industrial railways; where distances are long (and a central mixing plant can not always be located in the median point of the road

under construction) and the roads rough, the problem of removing the packed concrete from the truck is somewhat difficult, if not costly; and last, but not least, there have been many paving jobs where one paving mixer and gang laid more road, day in and day out, than was laid in any one day on the job described, and with less men. Doubtless this is in part due to the superiority of pre-war to post-war labor (most of these jobs date back to 1915, 1916 and 1917), but it seems that the paying management of the central mixing plant job is a complicated problem, and that, in the majority of cases, the paving mixer is more suitable for the average contractor.

In the job described, good management was apparent. With the conditions under which this job was carried on—scant space alongside the road for material storage piles, labor scarce and motor trucks plentiful—the method used possessed certain and unmistakable advantages. Without doubt, the central mixing plant idea has its place, but it is too much to say yet that it has any clear-cut superiority except in more or less special cases.

TO REDUCE TRAFFIC ACCIDENTS.

There were reported, during the year 1918, 679 deaths in New York City due to traffic accidents, or an average of nearly two a day. This seems like a large number, and if the same ratio of deaths to population were extended throughout the country the number would total more than twelve thousand a year. But Washington, D. C., with its much smaller population, reports fatal traffic accidents at the rate of 82 a year, and its ratio

applied to the entire country would give a total of more than twenty-one thousand.

Assuming the low New York rate and applying it to only the half of the country's population that lives in cities we have a mortality of more than six thousand a year, with several times this number of injured, due to traffic accidents—fifteen or twenty every day of the year.

The Highways Transport Committee of the Council of National Defense (which is still functioning) is conducting a campaign of education, the aim of which is to place basic suggestions as to safety regulations before the municipal authorities of the country, suggesting that they be embodied in local regulations. It believes that educational campaigns will be even more effective and cost very much less than enforcement of the regulations. In the past four years the number of deaths from traffic accidents in New York has been practically uniform in spite of increase in population and in traffic, while those in Washington have increased nearly 150 per cent. The committee attributes this to better enforcement of regulations in New York, but believes that the New York rate could have been cut considerably by securing, by education, voluntary rather than enforced observation of traffic rules.

In connection with its campaign the Highways Transport Committee is endeavoring to compile data relative to the number of accidents due to automobiles in the cities of the country, and will appreciate receiving from any one such information for a given city or cities and covering a stated period of time, preferably a month.

GUARANTIES FROM CONTRACTORS

Opinions of Courts in Various States as to Bonds or Retained Percentages to Insure Maintenance of Pavements—Most Courts Hold Them to Be Guaranties of Quality of Work Only.

By J. SIMPSON.

It is a matter of common knowledge that the usual method of making street improvements places upon the abutting owners the cost of the paving, or the construction cost, while the cost of ordinary repairs, or maintenance cost, is borne by the city. And, as is well known, it is a common custom to require from a contractor for the paving of a street, that he will maintain the pavement in repair for a period of years. This is usually done by taking a bond or stipulating for the retention of a percentage of the cost of the work. When this is done, does it throw the cost of the repairs, or any part of the maintenance, upon the abutting owners instead of the city, or is it a mere guaranty of the quality of the work? The majority of the cases hold that if the provision is limited to repairs made necessary by improper workmanship or by the defective quality of the material used, no additional burden is imposed on the abutting owners by the requirement of a guaranty for a reasonable length of time, and such a provision is valid. *Latham v. Wilmette*, (1897) 168 Ill. 153; *Cole v. People* (1896) 161 Ill. 16; *Shank v. Smith* (1901) 157 Ind. 401 (seven years); *Osborn v. Lyons* (1897) 104 Iowa 160 (five years); *Diver v. Savings Bank* (1905) 126 Iowa 691 (one year); *Durbert v. Cedar Falls* (1910) 149 Iowa 489 (five years); *Kansas City v. Hanson* (1899) 60 Kan. 833 (five years); *Barber Asphalt Paving Co. v. Yaar* (1903) 115 Ky. 334 (five years); *State v. District Court* (1900) 80 Minn. 293 (ten years); *Sedalia v. Smith* (1907) 206 Mo. 346 (five years); *Barber Asphalt Co. v. French* (1900) 158 Mo. 534 (five years); *Seaboard Nat. Bank v. Woesten* (1898) 147 Mo. 467 (ten years); *Barber Asphalt Co. v. Herzel* (1898) 76 Mo. App. 135; *Wilson v. Trenton* (1898) 61 N. J. L. 599 (five years); *Williamsport v. Hughes* (1902) 21 Pa.

Supr. Ct. 443; Erie v. Grant (1904) 24 Pa. *Supr. Ct. 109; American Bonding Co. v. Ottumwa* (1905) C. 37 Fed. 572.

It will readily be seen that the question raised is one of considerable importance to the public, especially to the cities whose charters provide for the construction of pavement in streets at the expense of the abutting owners of real property, or the property benefited, and that the pavement, when constructed, shall be kept in repair at the expense of the city. *People v. Featherstonhaugh* (1902) 172 N. Y. 112.

In *Bank v. Woesten, supra*, the Missouri Supreme Court said: "Municipal officers who, in contracting for such public work, should neglect to take from the contractor some kind of guaranty of the perfection of the work and materials, would be derelict in their duty and unfitted for the trust with which they had been invested. The kind of guaranty should be left to their discretion and business sense. We think no wiser or more adequate provision for securing perfection in the completed work could be devised than that of requiring the contractor to maintain it for a reasonable time, at such cost as would compensate for the repairs necessary to preserve good work and good material from becoming imperfect from natural and unavoidable causes." And in *Barber Asphalt Co. v. Herzel, supra*, the Missouri Court of Appeals said that the taking of a guaranty for the maintenance of construction and reconstruction of streets is the exercise of sound business sagacity, and is to the interest of both the abutting owner and the city. In *Williamsport v. Hughes, supra*, it was held that it is the duty of municipal officers when contracting for a pavement, whether the cost is to be paid by the city or is to be assessed against the abutting owners, to provide

for a substantial and durable improvement. And if the guaranty provision of such a contract involves no extra cost above what it would have been if the work had at first been executed according to the contract, then it must be held to be a contract of guaranty and not one for repairs.

In what is probably the latest case on the subject, *Bridgeport Const. Co. v. Duffey* (N. Y. 1919), 106 Misc. 252, 175 N. Y. Supp. 658, it was contended that the requirements of the specifications that the contractor guarantee and maintain the road for three years necessarily tended to impose upon the bond moneys a burden which was illegal, in that bidders would naturally present higher bids to meet the additional repair requirements, and thus indirectly the bond moneys which had been appropriated for new construction would be misappropriated for the making of repairs. The court considered that the natural effect of this guaranty clause is to increase the amount which contractors will bid for the construction of highways where the contract therefor contains this guaranty clause, and that by the terms of the specifications an attempt was made through this clause to provide, for a period of three years, for the maintenance and repair of such highways out of the funds appropriated for construction and improvement.

It was stipulated as one of the facts in this case that there was no amount added or included in the contractor's total bid price for the construction of the highway in question by reason of this guaranty clause, but the court considered that the validity of the clause itself must be determined not by the facts of that particular case, but by what was possible under it, and it attempted to provide for maintenance and repair out of funds appropriated for construction and improvement in violation of the New York Highway Referendum Act.

The court in the *Bridgeport Const. Co.* case held that a provision in a highway construction contract that the contractor guarantee and maintain the road for three years, authorizing the retention of a percentage of the contract price for one year after the acceptance of the work, is not "a guaranty of the quality and character of the work" such as was indicated in *People v. Featherstonhaugh*. Here by the stipulated facts there was an admission that it is not making good the imperfect work or materials, but is a guaranty to make repairs which "have become necessary by reason of ordinary wear and tear and causes other than defective workmanship or materials."

It is held, *Bridgeport Const. Co. v. Duffey*, *supra*, that a contractor, who has completed a highway and been paid everything due under his contract, except the 5 per cent retained by the state highway board under a clause requiring the contractor to guarantee the maintenance of repairs, cannot lie by and obtain the benefit of the contract, and then seek to receive the retained money and escape the terms of the agreement as to repairs, because of want of power in the highway commissioner to contract to pay for such repairs out of such moneys.

A city may require a contractor to furnish a satisfactory bond as a guaranty that he will keep a street pavement he contracts to construct in repair for a specified period (in this case 5 years) as a part of his warranty of the fitness of the material used. This does not imply that any money raised by special taxation is to be applied to the purpose of keeping the pavement in repair. *Cole v. People* (1896) 161 Ill. 16.

Specifications provided that the contractor should, without any extra compensation, keep in repair the curb and gutter under construction for two years after acceptance, by making good any settlement or derangement of lines

or grades of curbs, gutters, and crossings, and by replacing defective materials or work in curbs, gutters, crossings, and pavements. It was held, *Latham v. Wilmetto*, (1897) 168 Ill. 153, that this specification was no more than a guaranty that the work had been properly done, and the contractor made the agreement to repair if defective. In estimating the cost of the improvement the commissioners did not take into consideration any cost of repairing, and this requirement was held reasonable and proper. And in *People ex rel. North v. Featherstonhaugh* (1902) 172 N. Y. 112, 60 L. R. A. 768, it was held that no illegal burden is placed on abutting owners required to bear the original cost of street paving, by a provision in the paving contract requiring the contractor to maintain the work for a period during which such a pavement, if properly laid, ought to wear, although the duty to repair pavements is by statute placed on the city at large. In asphalt pavement, the court said, its durability depends very largely upon the character of the work, the condition of the foundation of the pavement, and the mixture of the material used; and inspectors may be deceived in regard thereto. A guaranty on the part of the company as to the durability of the pavement affords a simple and complete remedy, which fully protects the public. In this case the guaranty was for eight years.

Portland v. Paving Co., 33 Ore. 307, *supra*, was distinguished in *Allen v. Portland* (1899) 35 Ore. 420, where it was held that an agreement to repair defects during five years due to the proper uses of the pavement as a roadway was plainly intended to be merely a guaranty of the quality of the workmanship and material.

But the guaranty clause of the contract relating to repairs should not go beyond a mere guaranty of good workmanship and fitness of the material intended for use in paving the street. So, where a city charter only requires the original cost of a pavement to be borne by abutting owners and leaves to the city the expense of keeping it in repair, a contract which requires the contractor for ten years to make necessary repairs not only of defects caused by material and workmanship and natural wear and tear, but also of those caused by the action of the elements, is void, and its execution will be enjoined for casting unauthorized burdens upon abutting owners in the absence of proof that the period of the guaranty was no longer than the ordinary durability of such pavement when laid with the best workmanship and material. *Bradshaw v. Jamestown* (1908) 125 N. Y. App. Div. 86.

The contractor is required, under such a guaranty, to make only such repairs as he should be required to make pursuant to written notice served upon him in the manner specified in the contract, if such notice is thereby provided for. *O'Keefe v. New York* (1903) 173 N. Y. 174; *Southern Pav. Co. v. Mayor, etc., of Chattanooga* (Tenn. Ch. App.) 48 S. W. 92.

A requirement by city officers of the contractor for street pavement to give a bond to guarantee the faithful performance of work, to indemnify the city against suit, loss or damage by reason of negligence or default, want of skill or care on the part of the contractor, and requiring him to guarantee and keep in repair for one year, and retaining ten per cent of the amount of the contract for one year, does not cut off full and free competition in bidding, but is a suitable and reasonable guaranty for the faithful performance of the work, and advantageous to taxpayers in safeguarding expenditures of city funds, where the work is to be paid for by proceeds of bonds already issued and sold. *Dillingham v. Spartanburg* (1906) 75 S. Car. 549.

In *Asphalt Paving & Contracting Co. v. New York* (1910) 69 Misc. 588, 127 N. Y. Supp. 794, it was held that if defects in the plan of a pavement or insufficiency of the pavement render the contract requiring the contractor to make repairs impossible of performance, both parties to the contract would be excused from further performance, and neither could recover damages for the part not performed. But the court assumed that the contractor might be entitled to be relieved of the burden of repairs on that account.

A contractor for a street improvement guaranteed that the material and workmanship should be first-class in every particular; also that he would keep the street in good repair for five years and restore and repair at his expense any defects appearing in said street within that time. It was held that these clauses should be read together and only obligated the contractor for such repairs as were made necessary by the defectiveness of the work and materials, and not from unexpected causes. *Lindsey v. Browner* (Ky. 1906) 97 S. W.

An agreement by the contractor to keep the pavement in repair for a specified time does not impose on him the duty of repairing the damage done by the bursting of water mains. *Green River Asphalt Co. v. St. Louis* (1905) 188 Mo. 576. Under a contract to repair "if any part of the pavement should become defective from improper material or construction," no liability arises on the part of the contractor unless the repairs are shown to have been necessary because of defects arising from "improper material or construction." *District of Columbia v. Clephane* (1883) 2 Mackay (D. C.) 155. In affirming this judgment the United States Supreme Court said: "No evidence was offered that any of the material was imperfect or improper when placed there, or that any of this construction was improperly or defectively done. We think this was necessary to enable plaintiff to recover. It will not be presumed, because the work needed repair within three years, that the material furnished by plaintiff was originally imperfect, or that the construction was not well done. . . . In the absence, therefore, of any evidence that the pavement became defective within three years from imperfect or improper material or construction used by defendant, there was no case against him, and the direction of the judge was correct." *District of Columbia v. Clephane* (1883) 110 U.S. 212.

Some courts, however, take a different view of such guaranties. They hold that, no matter what the period for which the guaranties run, they necessarily tend to increase the cost of the improvement and cast upon the abutting owner part of the expense of maintenance as well as the cost of construction, and so invalidate the contract in which they appear. *Fehler v. Gosnell* (1896) 99 Ky. 380 (five years); *McAlliston v. Tacoma* (1894) 9 Wash. 272 (five years); *Boyd v. Milwaukee* (1896) 92 Wis. 456 (five years); *Excelsior Paving Co. v. Leach* (Cal.) 34 Pas. 116; *Verdin v. St. Louis* (Mo.) 275, W. 447.

In *Portland v. Bituminous Paving Co.* (1898) 33 Ore. 307, it was held that a bond which covers in effect all injuries liable to arise from whatsoever source is not authorized by a statutory power to take security by bonds for the performance of contracts. In *Alameda Macadamizing Co. v. Pringle* (1900) 130 Cal. 226, a bond guaranteeing the work for one year from injury by ordinary use was held unauthorized, improperly increasing the property owner's burden, and that the difference in time between one and five years was only a difference in degree. To the same effect is *Brown v. Jenks* (1893) 98 Cal. 10, where the court said: "It is manifest that the obligation to keep the street in repair for five years is

a burden which one would not undertake for nothing. Therefore a contractor would charge a higher price for the work when he was forced to contract also for repairs." These cases were approved in *City of Montgomery v. Barnett* (1907) 149 Ala. 119.

A well-known authority on the subject of municipal corporation II Dillon (Fifth Edition), § 829, gives the apparent reason for the conflict of the decisions on this point as follows: "It is to be observed of these conflicting decisions that the difference in result appears to arise rather from a difference of opinion as to the effect of the guarantee than from any disagreement as to the legal principle. The decisions which hold that a guarantee is a proper provision for the protection of the municipality and does not impose the expense of repairs upon the abutting proprietors seem to recognize three features of the guarantee before the courts as controlling, viz.: that the contractor was not required to guarantee his work against any other defects than those for which he might properly be held responsible; that responsibility for defects arising from causes for which he was not responsible, as from acts of the city or its licensees in opening the street, was not imposed upon the contract; and that the guarantee did not extend beyond such term of years as the pavement might naturally be expected to continue in good order. In some of the cases which have adopted the contrary view, the courts have relied upon the fact that the guarantee in question was in effect an agreement to keep the whole street in repair for a term of years, irrespective of the causes which might necessitate the repairs, or at least that it obligated the contractor to repair defects in the streets for which he was not responsible."

ORGANIZATION FOR REFUSE COLLECTION.*

Study of Operation and Efficiency of Existing Plan at Rochester and Recommended Organization of "Bureau of Sanitation."

At present the collection and disposal of garbage, ashes and rubbish in Rochester are functions of the Department of Public Works, the two latter being under the direct charge of the deputy commissioner, while the collection and disposal of garbage are in charge of a separate organization unit in the department. The investigators find that, from an operating standpoint, the existing organization gave poor executive efficiency resulting from decentralized control. The organization might prove effective in a small city but is not so for a large one. In a large city supervision must be made through reports of responsible subordinates, since it is impossible for any one man to personally supervise and direct all the activities of the department. Under the old organization too much work was loaded upon a few supervisory officers and these were inadequately provided with facilities for performing their duties. Too much responsibility for efficiency of the work lay with the foremen, and their influence was greatly diminished by the political influence of the discharged men. The report gives definite instances of such occurrences.

As illustrations of some of the effects of poor supervision, it is related that refuse receptacles are frequently allowed to remain on a street over night, after having been trucked out to the curb for collection but not having yet been emptied into the collecting wagon. In several instances, streets for several consecutive blocks were ob-

* Continued from page 14

served in this unsanitary condition over the week-end. The condition is invariably, and probably truly, attributed to the failure of teams to return for a final load. "Junking" is a favorite pastime of the rubbish collectors, both drivers and loaders sorting out all small materials of value as the contents of the receptacles are emptied. From three to five minutes are consumed in emptying a receptacle after it has been trucked to the curb; sometimes its contents are even emptied on the sidewalk in order that the sorting may be more thorough. The time lost in this way is of more importance than the revenue lost to the city. As a result of this practice, which is possible because of lax supervision, rubbish collections are poorly made and cost six times as much as ash collections.

Another practice that should be prevented is the placing of rubbish with the ashes when the amount of the former is small. Largely because of this, approximately 30 per cent of all the rubbish produced in Rochester is hauled to the ash dumps, littering them up and causing them to become unsightly and unsanitary, increasing the cost of ash collection and dump operation, and depriving the city of considerable revenue obtainable from recoverable materials. In one district, where rubbish is collected altogether separate from ashes, the amount of rubbish in proportion to the amount of ashes collected is more than half again as great as for the city at large.

It is essential that supervision of the garbage collection be of the highest order, which requires that the supervisory officers visit each of their collectors several times during the course of the day.

Unequal distribution of work is also partly responsible for the unequal efficiency of the various units of the collection forces. In nine districts of Rochester, during 1917, the average number of loads of ashes collected per man per day in the several districts during the year varied from a maximum of 2.64 to a minimum of 1.53; and the amount of rubbish collected varied from a maximum of 1.038 tons per man per day to a minimum of 0.591.

For a continuous week during 1917 a time study was made of ash collection, the result of which is shown in the accompanying table. Time of all laborers acting as foremen was excluded, in order to get only the actual time that was spent in the labor of trucking out ash receptacles, loading the contents onto the wagons, and returning the empty receptacles. The accuracy of the figures depends entirely on the degree of accuracy with which the receptacle canvass was made and the time sheets prepared. From observations made during the taking of the canvass and certain checks, such as duplication of a part of the canvass, it is believed that the results are substantially correct. This table shows that where a district is thickly populated, the number of receptacles is usually large in proportion and that where there are many factories and business places, the irregularity due to their presence is offset by the large number of receptacles per stop. It also shows that there is no district having low efficiency in collection work which cannot be matched

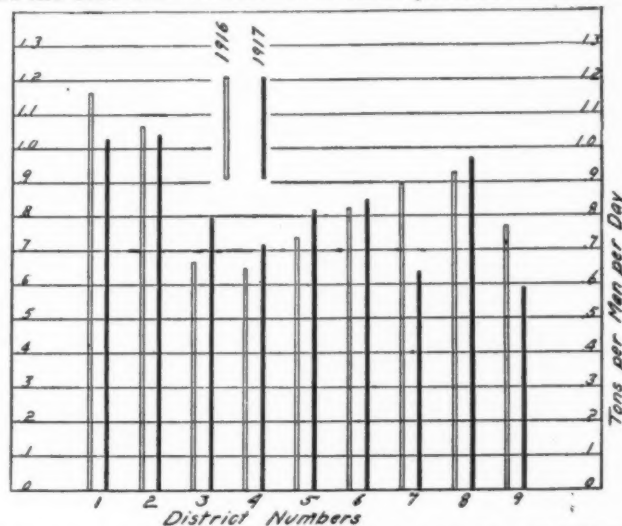
by a district having similar physical characteristics and a standard of performance above the average. Further conclusions are:

1. The unit cost of rubbish collection is not a criterion of the ability of the collection forces.

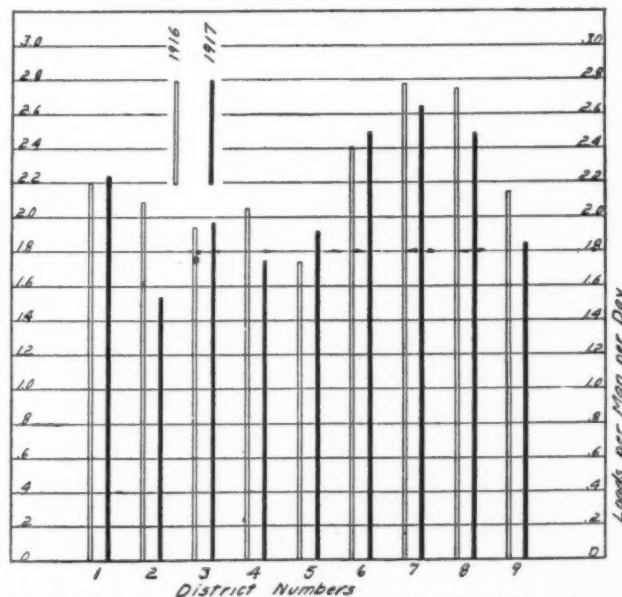
2. The unit cost of ash collection is a pretty good indication of the ability of the various district organizations to get things done.

3. The wide variation in efficiency between the labor forces of different districts evidently is due to the character of supervision and discipline maintained and not in any degree to physical differences in the work.

4. A more even division of work and a re-organization of the collection forces would make possible considerable



AVERAGE NUMBER OF TONS OF RUBBISH COLLECTED PER DAY PER MAN EMPLOYED.



AVERAGE NUMBER OF LOADS OF ASHES COLLECTED PER MAN PER DAY.

TIME STUDY OF ASH COLLECTION WORK.

	Dist. 1	Dist. 2	Dist. 3	Dist. 4	Dist. 5	Dist. 6	Dist. 7	Dist. 8	Dist. 9	Average
Gang—hours labor to complete collection	96	80	92	96	114	90	80	133	100	95
Man—hours labor to complete collection	970	1,115	895	828	1,024	662	857	1,321	756	936
Loads collected	293	178	189	159	241	174	249	424	152	229
No. of stops from which collections were made	2,701	4,189	3,800	5,332	5,630	3,685	5,898	8,012	2,396	4,627
Receptacles emptied	11,126	9,742	7,107	10,929	12,236	11,949	12,582	15,622	5,678	10,752
Stops per load	9.22	23.5	20.1	33.5	23.4	21.2	23.7	18.9	15.8	20.2
Receptacles per stop	4.12	2.32	1.87	2.05	2.17	3.24	2.13	1.95	2.37	2.33
Receptacles per load	38.0	54.6	37.6	68.8	50.8	68.7	50.5	36.9	37.4	47.1
Minutes per gang per load	19.7	27.0	29.2	36.2	28.4	31.0	19.3	18.8	39.5	25.7
Minutes per man per stop	21.5	16.0	14.2	9.3	10.9	10.8	8.7	9.8	18.9	12.2
Minutes per man per receptacle	5.2	6.9	7.5	4.5	5.0	3.3	4.1	5.1	8.0	5.2

increase in results per man-day; or conversely, greater economy in man-power.

In developing a plan of organization, several factors were considered, the more important being:

1. The kind and number of functions involved.
2. The area, topography and geographical layout of the territory to be served, together with probable future growth.
3. Present and future population and density of population.
4. The standard of service required.
5. The work methods employed.
6. The class of labor available.

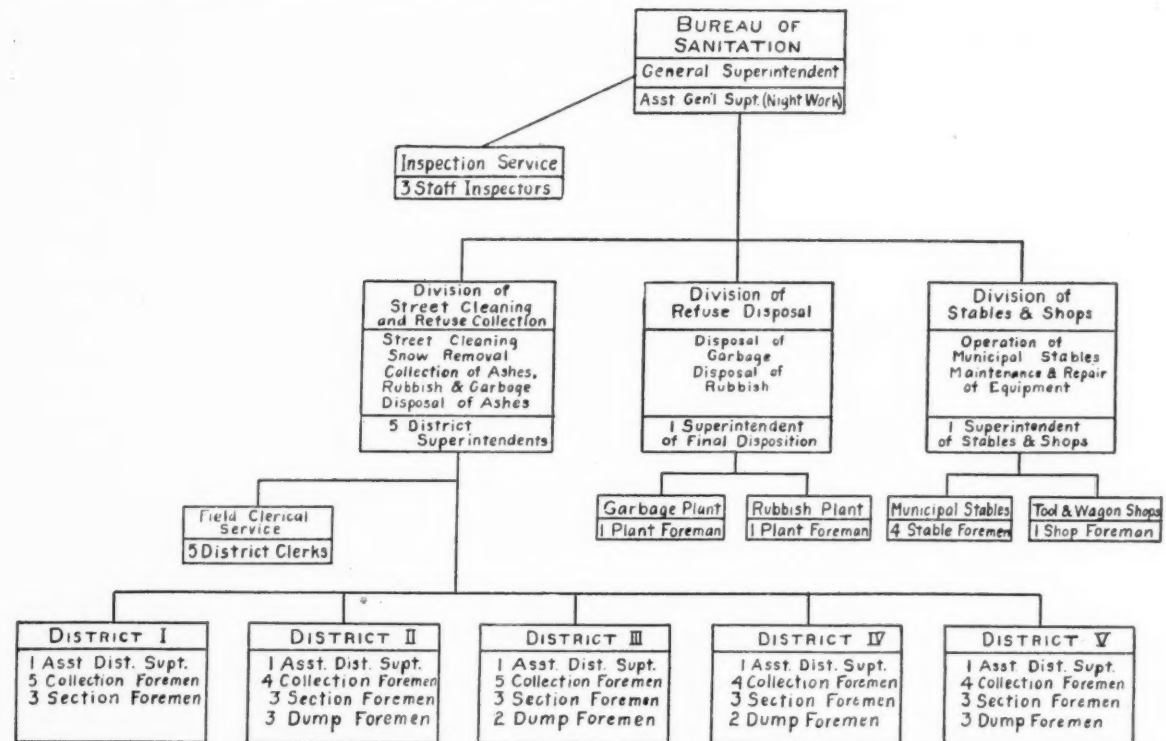
ORGANIZATION RECOMMENDED.

It is believed that any plan, to be successful, must be based upon the establishment of a permanent force operating under proper conditions as to basis of employment, training and supervision. The plan proposed and which, we understand, is being carried out, is indicated by the accompanying chart of organization of the Bureau of Sanitation of the Department of Public Works.

There are three general plans of organization which

successful operation under the functional plan of organization and that the cost of supervision under such a plan would be unnecessarily high. Experience with the geographical plan in Rochester had indicated that it would not prove satisfactory, and it would require a large and expensive supervisory force to be effectively carried out. Study of the layout and other characteristics of the city led to the decision that for Rochester a 5-district plan could be worked out most satisfactorily, and this number of districts was recommended, with organization under the third plan.

The suggested organization of the proposed bureau of sanitation would include three divisions; a division of street cleaning and refuse collection, which would have as its functions the field work of street cleaning, snow removal, ash, rubbish and garbage collection, and the disposal of ashes; a division of stables and shops which would have as its functions the maintenance and repair of the street cleaning and refuse collection equipment and the maintenance and operation of municipal stables; and a division of refuse disposal, which would have as its functions the disposal of garbage and rubbish reclamation and disposal.



PROPOSED ORGANIZATION OF A BUREAU OF SANITATION OF THE DEPARTMENT OF PUBLIC WORKS.

might be adopted for such service. First, the organization might be entirely functionalized, which would mean that one officer would be placed in charge of each kind of work and would be held responsible for all work of that kind done in the entire city. Second, the organization might be entirely geographical, under which plan all of the work of street cleaning and refuse collection would be carried on under the direction of a single officer in each of a number of small geographical divisions of the city. Third, some combination of the two plans mentioned might be adopted; that is, the city would be divided into several relatively large geographical units, each in charge of a single responsible officer; but below this single executive the work would be functionalized, that is, immediate supervision over the different kinds of work would be effected through functional foremen reporting directly to the district superintendent.

It was concluded that Rochester is too large a city for

With the city owning all of its teams and equipment used in street cleaning and refuse collection, the maintenance of the horses and equipment and the repairs which would be necessary seem to be a work of sufficient magnitude to call for a separate division, the head of which would have the title of superintendent ranking with the district superintendents of the division of street cleaning and refuse collection.

The division of refuse disposal would be headed by a superintendent ranking with the district superintendents, who would be responsible for the operation of the garbage reduction plant and the rubbish incinerator. It is not believed, however, that supervision of ash dumps should rest with this division, since final disposition of the ashes is so closely connected with the field work of collection that the district superintendents of collection should be better able to supervise this work.

The report outlines as follows the suggested order of

rank and the distribution of authority, sub-division of work and duties of the working forces:

THE WORKING FORCES.

1. General Superintendent: Executive or active head of the Bureau of Sanitation. Responsible to the commissioner of public works.

2. Assistant General Superintendent: Assistant to the general superintendent; in charge of all night work; executive head of the Bureau of Sanitation in the absence of the general superintendent. Responsible to the general superintendent.

(In addition to the general superintendent of the Bureau of Sanitation, it is believed necessary that there be an assistant general superintendent to assume charge of all night work, including street cleaning and snow removal, and to act as executive head of the bureau in the absence of the general superintendent. A more detailed discussion of the need for an assistant general superintendent will be found in this Bureau's report on the problem of street cleaning.)

3. Five District Superintendents (one in each of the five districts): In immediate charge of all day work, including street cleaning, snow removal, ash, rubbish and garbage collection, and ash disposal. Responsible to the general superintendent.

4. Five District Clerks (one in each of the five districts): In charge of all field records and reports, each under the direct supervision of a district superintendent, but with no direct authority over any of the force employed.

5. Five Assistant District Superintendents (one in each of the five districts): In charge of the collection of garbage; but on occasion assigned to other special duties, such as acting district superintendent in the latter's absence. Each responsible to his district superintendent.

6. Fifteen Section Foremen (three in each district): In immediate charge of all street cleaning, pick-up work, snow removal, crosswalk cleaning and gutter drainage. Each responsible to his district superintendent.

7. Twenty-two Collection Foremen (four in each of Districts II, IV and V, and five in each of Districts I and III): In immediate charge of the collection of ashes and rubbish. Each responsible to his district superintendent.

8. One Street Cleaning and Collection Foreman in Charlotte: In immediate charge of all street cleaning and ash and rubbish collection work. Responsible to the district superintendent in District V.

9. Ten Dump Foremen (one at each dump): In charge of the operation of the ash dumps, to keep records of loads hauled to their dumps. Each responsible to his district superintendent.

10. Drivers, street cleaners, flushers, patrol sweepers, pick-up men, roustabouts, truckers and loaders, dump laborers: The regular street cleaning and refuse collection labor force. Working under the immediate direction of foremen.

11. Emergency laborers: To supplement the regular street cleaning and refuse collection labor force as necessary. Working under the immediate direction of foremen.

OTHER RECOMMENDATIONS.

Among other questions considered are the permanency of employment of the force, which is considered to be very important. The enforcement of civil service rules in filling positions in the bureau, and the adoption of a system of merits and demerits and a conduct record for each employe might be developed similar to that carried out in the New York Department of Street Cleaning by Commissioner Fetherston.

To aid in what might be termed "administrative supervision" to assist in standardizing the movements and habits of the officers (who cannot be kept under direct supervision except in a limited degree), it is suggested that a day book or daily blotter be kept at each section station, dump office, stable, and district headquarters as well as at general headquarters. Every foreman and superintendent should be required to sign the blotter and note the time of arrival and of leaving each station. This blotter system was found both valuable and practicable in the New York Department of Street Cleaning.

Uniforms are considered desirable for several reasons which have already been detailed in Municipal Journal and Public Works. The color and type of uniform should be adapted to the work, it being suggested that white

be used for street cleaners, khaki for members of the collection force, plant laborers, assistant foremen, etc., and olive green for the officers. In addition to the uniform, every member should be required to wear a badge, those worn by the officers indicating their rank, and those by the laborers bearing identification numbers. It is suggested that a school for recruits be established similar to the one conducted by the Department of Street Cleaning of New York City.

For emergency labor, required in summer for street cleaning and in winter for snow removal, preference should be given to men on the civil service eligibility list, and when that has been exhausted, recourse should be had to specially compiled emergency lists giving the names and addresses of men available for work on short notice.

WATER WORKS ACCOUNTING AND BILLING.

System and Methods Recently Adopted at Milwaukee—Accounts on Block System—Billing Machines—No Receipts Returned.

On June 1st, 1918, the water works Division of Collections of Milwaukee, put into operation a new system of handling accounts that is reported by Osw. J. Ronge, chief of the division, to be far superior to the old method. He describes the system as follows:

The city is divided into two general subdivisions, with Wisconsin street-Grand avenue as the dividing line. The entire portion of the city north of this line is divided into blocks, each block comprising one or more city squares and containing approximately 100 accounts. These blocks are numbered in parallel lines from east to west, with odd numbers only, 100 numbers being allowed to each of the parallel lines. The same system is employed for the portion of the city south of the dividing line, but even numbers are used.

The block numbers are permanent and do not change.

All consumers' accounts in each individual block are numbered consecutively from one up, beginning at a common starting point in each block.

For facility in handling the work at the office, the city is divided into nine equal sections, each beginning at the lake shore and radiating wedge shaped to the outskirts. One senior clerk-bookkeeper is assigned to each section, with complete charge of all accounts therein. The advantage of this arrangement is that it distributes the work equally among the senior clerk-bookkeepers, as each section contains part of the down-town or business district, part of the central and part of the outlying district.

All consumers' ledger cards were renumbered and set up in accordance with the plan outlined above. All inspectors of water meters route slips were renumbered and set up in route books to conform with ledger cards.

Meters are now read as set up in these route books. During the final months of quarters, when readings of accounts in route books are taken, instead of the inspectors of water meters being obliged to make abstracts from the books on quarterly reading slips, which in turn had to be delivered to the office and assorted and given to clerks in charge, they simply turn in their books and assessments are computed directly from field reports, avoiding a multitude of errors.

When one or more blocks have been computed, the senior clerk-bookkeeper can immediately proceed with the preparation of the assessment roll, instead of waiting until all readings were in and all accounts computed, as was necessary under the connection number plan.

Billing can be begun by clerks immediately after the first day's readings are in and accounts computed, instead of waiting until all readings have been taken and inspectors of water meters have reported at the office.

Under the new plan, when all readings have been taken and accounts computed and billed, bills are in the same rotation as ledger cards and route book accounts, and are immediately ready for delivery. All time required for assorting bills for delivery has been eliminated. The time required under the old system for inspectors of water meters to fill in the daily reading slips, detailed daily work report, billing, assorting bills, etc., is now put in on routes taking readings that they were formerly obliged to omit.

Billing Machines.—All billing at this office is now done by especially constructed machines. By these machines, present reading, previous reading, consumption and amount are printed on the bill, as well as the amount printed on stub. The amount is set in and printed on the bill, and the machine automatically shuttles over and prints the amount on the stub, without again setting in figures on the machine. Further, the machine accumulates the consumption and amounts.

These machines have proven very satisfactory for the following reasons:

Firstly: Bills can be more expeditiously filled in; in fact, increasing the output more than 100 per cent over billing by hand.

Secondly: A much neater and more legible bill is produced than when written by hand. Where thirty-six men are writing bills, you have thirty-six different kinds of chirography, with a certain percentage always difficult to decipher by receiving tellers.

Thirdly: As the cubic feet are accumulated, it is unnecessary to again go over accounts to pick up the same for monthly reports to general office, eliminating that extra work.

Fourthly: As amounts are accumulated, all time for running bills on adding machines to check with assessment roll has been saved.

Fifthly: As amounts on bill and stub are printed from same type with but one setting on the machine, all errors between bill and stub, by transposition or otherwise, are eliminated, and all time for comparing bills and stubs is saved.

Sixthly: With upwards of 65,000 accounts, a very great saving of labor has been shown by these machines.

The above described section, block and account number system for handling consumers' accounts has now been in operation for one year, during which time it has exceeded all expectations and shown a tremendous elimination of unnecessary and duplication of work, in addition to showing a very substantial saving of labor, stationery and postage. Were we still operating under the old connection number system, an addition to the field force of at least two men would be necessary during the year 1919, amounting to an increase in the payroll of upwards of \$2,000.

Notwithstanding the fact that the number of consumers is continually increasing, under the new plan the present field force will be ample to handle the work of the division during next year. The elimination of unnecessary and duplication of work will amount to several thousand dollars annually and the saving of labor, printing and postage after all deductions and offsets, to an equal amount annually. Moreover, it furnishes the proper control over field men.

The entire force, both office and field, are enthusiastic over the new system, as it greatly facilitates their work,

and they claim that in every respect it is far superior to the old connection number system.

Returning Receipts.—The practice of returning receipts for mail remittances was discontinued during 1910. The following foot note was printed in red ink on quarterly water bills: "Unless requested, receipts will not be returned on mail remittances." Receipts had, since the establishment of the water works, always been promptly returned for all remittances received by mail, and there was some doubt as to the manner in which the public would view this change. However, no difficulty has been encountered and no complaints received from consumers. On account of the other public service utilities having followed a similar plan for some time the adoption thereof by the water works was evidently not unexpected by the consumers.

This has reduced the cost for postage for that particular service upward of 75 per cent, showing a saving of better than \$300 per annum, in addition to saving the time necessary for addressing and mailing.

CHLORINATION IN WEST VIRGINIA.

Public Water Supplies of That State Which Are So Treated—Results of Disinfection in Lowering Typhoid Rates.

Through the courtesy of Mayo Tolman, director and chief engineer of the Division of Sanitary Engineering of the Department of Health of West Virginia, and of E. S. Tisdale, assistant engineer of the division, we have received very complete information concerning the use and results of use of chlorine in connection with the public water supplies of West Virginia.

Commenting upon the experience had in general in that state, Mr. Tolman writes: "Liquid chlorine as a disinfectant for drinking water supplies has shown its efficiency to a very marked degree in West Virginia. In fact, the results obtained by its use as represented by the reduction of typhoid have been quite marvelous.

"Unfortunately, our vital statistics are so poorly kept and so inaccurate that no definite conclusions can be drawn, but I am under the impression that liquid chlorine as a water disinfectant does not make the so-called Mills-Reincke phenomenon so apparent as when filtration is adopted. This, however, is guess work at the best, but I believe that it would be profitable for communities that have accurate vital statistics to investigate this statement. It would appear from the data at hand that, instead of the deaths from all causes being reduced approximately in the ratio of four to one, the reduction does not much exceed two to one."

A few weeks ago we referred briefly to the probability that persons brought up on water containing typhoid germs acquire an immunity that is not possessed by those who have always drunk only the purest of water. This idea appears in Mr. Tolman's letter, in which he says: "It has been my experience that when liquid chlorine is used and the apparatus breaks down or is put out of commission for any reason and polluted water is allowed to enter the city mains, an epidemic of typhoid results and this epidemic is invariably more severe and more explosive in its violence than any outbreaks previous to the first use of the disinfectant. Chlorine seems to have a remarkable capacity for breaking the chain of natural immunity that develops in a community continually using a polluted supply. For example, for years Elkins used a polluted source of supply with no serious outbreaks of typhoid. To be sure, there was always a high typhoid rate, but never what one would call an epidemic. In 1916 I introduced

a chlorinating plant in that town and in the spring of 1918 this plant went out of commission. About two weeks after the break-down, Elkins experienced a very severe epidemic of typhoid, deaths resulting. (More details of this are given later on.) This has been my experience almost universally throughout the state, and consequently my attitude now is that no community should be dependent upon one chlorinator solely. Chlorine being a highly corrosive gas, it is quite remarkable that the apparatus handles it as long as it generally does. Sooner or later the machine must be taken out and cleaned and repaired, and the danger at such times is acute. If we had the laws, I would make it a hard and fast rule that no community should be dependent upon one chlorinator solely."

Concerning the matter of tastes and odors, Mr. Tolman says that, while several West Virginia towns are now experiencing trouble of this kind, he finds that wherever there are tastes and odors there are tarry or oily wastes present in the stream, although they may be in minute quantities only. He suggests that filtering the water through saw-dust before chlorinating it would probably eliminate this danger.

Instead of using large amounts of chlorine for disinfecting drinking water, he finds that if chlorine is introduced at several points—for example, one application in the raw water, another just before it goes into the filter, and a third in the clear water, the total dose can be decreased and kept within 0.3 part per million, "which has proven in this state to be an optimum."

Use of Chlorine for West Virginia Water Supplies.

Town.	Population. 1910.	1918.	Source.	Chlorine plant Installed.	Has Treatment Been Continuous?	Filtration or Other Treatment.
Barboursville	907	1,200	Guyandotte river	Oct. 1918	Yes	Filtration through crib in sand bar of river
Bluefield	13,974	17,000	Mountain springs	1915	Yes	.....
Buckhannon	2,225	4,000	Buckhannon river	1916	Yes	Two 500,000-gal. Cont.-Jewell filters installed 1919
Kenova	992	1,200	Big Sandy river	1917	Liquid chlorine & hypochlorite used	Lime & iron followed by sedimentation in reservoir
Clendennin	815	1,500	Elk river	1916	Failure to operate plant properly during flood caused fever outbreak, Feb. 1917	.....
Dunbar	61	1,200	Kanawha river	Summer, 1917	Liquid chlorine or hypochlorite used continuously	Pressure filter
Elm Grove	1,899	2,500	Pleasant creek	1918	Yes	Mechanical filtration
Elkins	5,260	7,000	Tygarts valley	1916	Except for 2 mos. in spring of 1918	Mech. filtration plant now being designed
Fairmont	11,439	20,000	Tygarts valley	1916—Unsatisfactory 1918—Satisfactory plant installed	Continuous since Dec. 1918	Storage in 6 million gallon reservoir
Gassaway	1,086	1,200	Elk river	1917	Except during high water Mar. 1918	None
Grafton	7,563	10,000	Tygart valley	1916—Unsatisfactory 1918—Satisfactory installation	Not until July, 1918	None
Hinton	3,656	5,200	Greenbrier river	1918	Yes	Pressure filters—two 500,000-gal. units
Huntington	41,515	54,500	Ohio river	1914	Yes	6 units—Cont.-Jewell mechanical filters
Kingwood	800	1,200	Indian Crk.	1918	Yes	None
Lewisburg	803	1,100	Greenbrier river	1917	Yes	None
Morgantown	12,239	16,000	Monongalia river	1918	Yes	Mechanical filtration
Parkersburg	19,917	23,500	Ohio river	1917	Yes	Smith system; filter beds in Ohio River
Petersburg	500	1,200	So. branch Potomac river	1917	Yes	None
Piedmont	2,054	4,500	Savage & Potomac river	Hypochlorite emergency plant May 1914	No	None
Pratt	306	450	Kanawha river	1917	Yes	Small filter
Shepherdstown	1,070	1,100	Potomac river	Sept. 1918	Yes	Slow sand filter and public water supply installed 1918
Sistersville	2,684	4,000	Ohio river	1917	Yes	New mech. filter plant completed 1917—Chlorination installed then
St. Albans	1,209	2,500	Coal river	1916	Yes	None
Stealy Heights	511	2,000	West Fork river	1917	Yes	None
Thomas	2,354	2,500	Blackwater river	1916	No—plant unsatisfactory	None
Wellsburg	4,189	5,000	Ohio river	1917	No—plant removed	None
Wheeling	42,817	56,000	Ohio river	No. 1918	Yes	None
Charleston	27,703	45,000	Elk river	1916—Shifted from hypo to liquid chlorine	Yes	Mechanical filtration
Weston	2,213	4,000	West Fork river	1916—Shifted from hypo to liquid chlorine	Yes	Mechanical filters
Martinsburg	12,032	16,000	Springs in lime-stone	Hypo treatment started 1915	Yes	None
Clarksburg	25,000	35,000	West Fork river	Hypochlorite treatment	Yes	Mechanical filtration
Welch	1,256	3,000	Deep well	1917	No	None
Philippi	1,038	1,500	Tygarts Valley riv.	1917	No—machine not giving good service	None
Logan	1,640	5,000	Guyandotte river	1917—Hypochlorite treatment	Yes	None
Ronceverte	2,157	2,500	Greenbrier river	1917	No	None
Williamson	3,561	5,000	Tug fork	Hypo treatment, 1912	Yes	Rapid sand filter
Matewan	588	1,000	Tug fork	Hypochlorite treatment in 1916	Yes	Pressure filter
Cons. Coal Co. Monongah	2,084	4,000	West fork	1918	Yes	None
W. Va. Coal & Coke Co. Norton	150	1,200	Tygart valley	1918	Yes	None
Black Betsey Con. Coal Co., Black Betsey	350	500	Kanawha riv.	1918	Yes	None
White Sulphur Springs .....	.....	.....	Springs	1917	Yes	.....
Belington	1,481	1,600	Tygart valley	1919	.....	None
Richwood	3,061	6,000	Cherry river	1919	.....	None
Total population..	267,159	378,850				

Most of the information given concerning the 43 chlorinated water supplies in West Virginia are shown herewith in tabulated form. Information concerning the prevalence of typhoid before and after chlorination, however, is given in the following running statement:

Buckhannon had a bad outbreak of typhoid in 1914, a chlorine plant was installed in 1916, and there has been practically no typhoid since that time.

In Clendennin, typhoid was endemic during 1915 and 1916, with thirty cases in the spring of 1917. With a chlorine plant operating successfully since 1917, there was no outbreak in 1918 or 1919.

In Dunbar there had been considerable typhoid, there being twenty-eight cases in June, 1917. A chlorine plant was installed that summer and there has been marked freedom from typhoid since that time.

In Elkins, typhoid was endemic during 1914 and 1915, and the chlorine plant was installed in 1916. Typhoid was notably absent from the city after this until March, 1918, when the chlorine plant went out of commission for two months on account of lack of gas. There resulted a serious outbreak, with 129 cases and 7 deaths during March, April and May. There has been practically no typhoid since that time.

Fairmont had much typhoid during 1917, with two epidemics in 1918, there being 28 cases in early spring and 91 cases in the late summer. In 1918 a satisfactory chlorine plant was installed and only three cases have been reported this year.

Gassaway had been a hot-bed of typhoid fever ever since the town started. A chlorine plant was installed in 1917. Its operation was interrupted by high water in March, 1918, following which there was an outbreak of 25 cases of typhoid. Since then up to date there have been practically no cases.

In Grafton typhoid was very prevalent. An unsatisfactory chlorinating plant was installed in 1916, but following a severe outbreak with 40 cases in May and June, 1918, a satisfactory plant was installed and there has been a marked reduction in typhoid cases.

St. Albans had an outbreak in 1916 of 34 cases and a chlorine plant was installed. Since then there has been no outbreak, although a scattered case appears now and then.

Thomas had an outbreak with 7 cases in 1916. A chlorine plant was installed resulting in immediate reduction of typhoid. The plant was not a mechanical success and after being dismantled no satisfactory machine was obtained in its place and the typhoid rate is again high.

Wellsburg, following 9 cases of fever in 1916, installed a chlorine plant in 1917. The combination of chlorine with bleach wastes from the paper mill imparted tastes and odors to the water and the chlorinator was removed a few months later, the people boiling their water now that the chlorinator is out of service.

Wheeling for thirty-three years had an average loss of 33 deaths per year from typhoid. For ten years ending 1915 the typhoid death rate was 165. In November, 1918, a chlorine plant was installed, and the same month the case rate dropped from 36 to 17 and declined during the succeeding months to 5, 2 and 1. Practically no fever has been reported to date in 1919.

Charleston had two bad epidemics due to by-passing unfiltered water to the city. In 1917 there were 329 cases and 19 deaths, and in 1918, 190 cases and 35 deaths. Using a very high chlorine dosage probably has been the salvation of the city this spring while a new filtration plant is being constructed. A dose of over one part per million has been applied much of the time.

Piedmont in May, 1914, had an epidemic with 144 cases

in a population of 3,300. A hypochlorite emergency plant was installed that month but was discontinued December 1, with the result that there were 29 cases that month and 34 in the month following, although during the five previous months the number of cases had been 7, 4, 2, 1 and 0 respectively. Water treated with hypochlorite is being furnished to this town at present.

At the Black Betsy Consolidated Coal Company there was an outbreak among the miners in 1918 due to a bad water supply, but a chlorine plant was installed and since that time there has been no fever.

Concerning most of the other supplies which have been chlorinated, the statement is made by Mr. Tolman that typhoid was very prevalent but has been greatly reduced by the use of chlorine, although there are no records for comparison. In a number of towns, however, the plant was installed as a precaution rather than because there had been any considerable amount of typhoid fever.

CONSTRUCTING CONCRETE PAVEMENTS.

Standard Practice as Recommended by the Mississippi Valley Association of State Highway Departments—Materials and Construction.

A conference on recommended practice for rural concrete road construction was held in Chicago a few weeks ago, by the Mississippi Valley Association of State Highway Departments. As a basis for discussion, the conference used the practice recommended last year by the American Concrete Institute. The discussion resulted in an agreement upon certain points of difference between this association and the Concrete Institute, and upon amplification of and additions to the practice that it had recommended. Some of the more important of these are as follows:

MATERIALS.

Laboratory tests for fine aggregate to include colorimetric tests for organic impurities, sieve analysis, both tensile and compression tests of mortar, and volume of silt. Field tests to include grading with a nest of sieves Nos. 4, 8, 14, 28, 48, and 100; and volumetric test for silt by shaking with water in a graduated glass cylinder.

Fine aggregate to consist of natural sand, or a mixture of this with screenings from durable stone and free from dust, at least 50 per cent by volume to be sand; all passing a screen having 4 meshes per inch.

Coarse aggregate for one-course pavement or the base of two-course to consist of sound and durable pebbles or crushed stone, with French coefficient of wear of not less than seven, or of slag of suitable quality and uniformity; all to pass a 2½-inch screen, be graded with reasonable uniformity, and at least 95% be retained on a ¾-inch screen. For the wearing course of a two-course pavement, the requirements to be the same, except that all should pass a 1-inch screen.

For a one-course road, the proportions to be 1:2:4, if machine-finished, and 1:2:3½ if hand-finished. For a two-course road, 1:2:4 for the lower course, and 1:2:3½ for the wearing course.

Extreme care to be used in amount of water applied, and "slump" test be used as follows: Fill 6 x 12-inch cylinder with concrete, tamped, as mixed for use, and immediately remove cylinder; if pavement is to be finished by hand, the concrete cylinder should not slump more than 6 inches, nor more than 2 inches if to be machine-finished.

DESIGN.

The minimum thickness should be 7 inches at the sides, 7 inches in the centre of a single-track road, and 8 inches at the centre of a two-track road up to 20 feet wide.

Width of road to be not less than 18 feet, or 9 feet if a single-track road *must* be built. No widths between 10 and 16 feet to be used. Total width, including shoulders, to be at least 8 feet more than pavement width, and width of grade to be traveled, not less than 24 feet.

Crown to total 1 inch for two-track road not more than 20 feet wide, $\frac{1}{2}$ -inch for single-track, unless latter have one edge in centre line of road, when continuous slope of one inch all in one direction.

No curve to have radius on centre line of less than 200 feet. On all turns, the centre line of the road to be marked by a white strip 8 inches wide. Unless drainage conditions prevent, grade of centre line at curves to be maintained where pavement is superelevated, and crown of surface to be flat.

In middle west, grade should not exceed 6 to 8 per cent under ordinary circumstances. On steep grades vertical curves should be sufficiently long to give an unobstructed view of at least 250 feet.

Culverts and bridges to be of reinforced concrete built in place. Up to 12 feet span, clear width should be not less than full width of road grade as constructed; over 12 feet, clear width to be at least 20 feet, or 2 feet more than pavement width; sidewalks to be in addition to this width where they are built.

SUBGRADE.

If possible, subgrade to be not trenched out, but kept higher than berms, so as to drain directly to side ditches. Subgrade to be rolled with macadam type of roller of 10 tons or more. If rolling causes waves, stop at once and investigate for soft material; in clays, waves probably due to moisture, which should be dried out or replaced with suitable material. Depressions that develop under rolling to be filled with suitable material. Sandy soils require less rolling than others.

Rough-grade very close to intended cross-section and to full width of shoulders. Avoid shallow filling or filling narrow, deep ruts without plowing. Finish subgrade to proper cross-section, using template, just ahead of concrete. If aggregates are deposited on subgrade, bring this to true cross-section in sections not more than 600 feet long immediately before aggregates are deposited, and keep roller in constant operation while they are being delivered, filling and tamping any ruts formed. Hauling over finished subgrade to be avoided as much as possible.

EQUIPMENT.

The use of industrial railway is recommended. The mixer should be of standard paving type, having capacity of at least a two-bag batch; should have boom and bucket or other device for delivering concrete of proper consistency, automatic timing device and one for measuring amount of water per batch. For supplying water, use duplicate pumping machinery, booster pumps on long pipe lines, unions on pipe lines at intervals of not more than 1,000 feet, and tees at intervals of not more than 100 feet.

CONSTRUCTION.

Mixing to continue at least one minute at not less than 12 r. p. m. All materials to be accurately measured in receptacles of such size that minimum number of units when struck off level will give proper quantity for batch.

Steel side forms to be used, using straight-edge to insure horizontal and vertical alignment.

Depositing, spreading and finishing concrete to be as nearly continuous as possible for full width and thickness

of pavement. If delay is necessary, sufficient to permit concrete to take initial set, suitable header to be placed at right angles to road and concrete finished against this. No device or method for transporting concrete from mixer to place on subgrade to be used which tends to produce segregation of materials that later operations will not completely eliminate.

Work should close by date when temperature normally is materially below freezing point. If continued beyond this, precautions to be taken that will absolutely insure concrete against freezing for at least 7 days after placing.

Expansion joints to be used only in specific cases, such as junctions between pavement and other fixed objects. When used, to consist of either high-grade wool felt or a fibrous material combined with a coal tar or asphalt compound; not more than 8% by weight to be mineral matter, nor more than 25% fibre. Contraction joints not to be used. Construction joint to be made whenever mixing is stopped for more than an hour. Reinforcement is of questionable value for pavement up to 18 feet width, with good foundation; but reinforcement, mainly in a transverse direction, may be used to advantage for wider pavement, especially if foundation is not thoroughly satisfactory. Use wire mesh or separate bar reinforcement, not less than 40 lbs. per 100 square feet, proportion of transverse to longitudinal steel not less than 3 to 1; place not less than 2 inches from finished surface, lap at least 4 inches longitudinally and 12 inches transversely.

When the mixture used is relatively dry, as is necessary to secure maximum strength, mechanical strikers and tampers should be used, so constructed and operated as to strike off and thoroughly tamp the concrete and be operated repeatedly over the same area, and leave the finished slab true to grade, crown and surface and absolutely free from porous places.

If a mechanical finisher is not used, and the consistency of the concrete is as above described, the concrete should be thoroughly tamped by means of a tamper operated vigorously by one or two men at each end on opposite sides of the roadway, so consolidating the concrete as to close all voids; this to be followed by a strike board and the pavement left as after machine finishing, and finally finished with a belt.

If medium consistency is used, spread, agitate and tamp the concrete, so as to positively insure avoidance of stone pockets or porous places, strike off, and roll with a light hand roller so as to remove surplus water and leave the surface true to grade and crown. Then finish with a belt.

As soon after finishing as it can be done without marring the surface, cover the concrete with canvas. As soon as it is sufficiently hard, if grade and other conditions permit, build longitudinal and transverse dikes and fill them with water covering the concrete 2 inches deep, keeping water on for at least 14 days. Where ponding method of curing is impracticable, cover the concrete with at least 2 inches of earth and keep it moist for at least 14 days, wetting it at intervals of not more than 12 hours.

Traffic should not be permitted to use the pavement in less than 21 days, nor less than 40 days if the curing conditions were unfavorable, nor for at least 3 days after removal of water or earth covering, nor until all dike or earth coverings have been completely removed.

Inspectors should have practical experience, knowledge of specifications and construction, absolute integrity, quick decision, sound judgment, forceful personality, common sense, ability to command the respect of the contractor, broad perspective, and ability to distinguish between essentials and non-essentials. The pay should be sufficient to obtain such men.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals.

It is our purpose to give in the second issue of each month a list of all articles or any length or importance which have appeared in all the American periodicals and the leading ones published in other countries, dealing more or less directly with municipal matters. The Index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In further issues of the paper, the price given is for an article is continued in two or three each of said issues. In addition to the titles where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its given, and the name of the author when contents is added. The length also is it is a contributed article.

ROADS AND STREETS.

Bituminous Roads:

Hot Mix Asphalt Pavements. Utilization of existing pavements as foundation; mineral aggregates; types of hot mix pavements. From paper before Canadian Good Roads Congress, by F. P. Smith, N. Y. C. 4,000 words. Engineering and Contracting, June 4. 15 cts.

Operation Costs of Municipal Asphalt Plant. Portland, Ore., effects large saving over contract methods; plant pays for its cost three times in seven months. 1,200 words. Engineering News-Record, June 19. 20 cts.

How a Contractor Equipped His Asphalt Plant to Dispense with Two Men and Lower Cost of Asphalt. By M. R. Butler, Waukesha, Wis. 1 ill., 300 words. Municipal and County Engineering, June. 25 cts.

Bituminous Macadam. Preparation of foundation; laying first and second course; condensed rules for successful construction of bituminous macadam. From paper at Canadian Good Roads Congress, by A. W. Dean, chief engr., Massachusetts Highway Commission. 1,500 words. Engineering and Contracting, June 4. 15 cts. 1,800 words. Municipal and County Engineering, June. 25 cts.

Hot Mix Bituminous Pavements. Editorial discussion of the deserved popularity of this pavement and its possible use as "the pavement of the future" for heavily traveled roads. 1,000 words. Good Roads, June 7. 10 cts.

Concrete:

Specifying Dry Concrete for Road Surfaces. Should be stipulated only at places at which the surrounding conditions can be anticipated; editorial discussion. 600 words. Engineering World, June 1. 15 cts.

Suggestions for Concrete Pavement Construction. Detail plans of strike boards, joint boards, roller, belt, floats and other appliances used; various procedures of construction; features that should receive special attention of inspectors. 2 ill., 2,000 words. Municipal Journal and Public Works, June 14. 10 cts.

Suggestions for Concrete Pavement Construction. Conclusion of article begun in June 14th issue; belt finishing and curing pavements and general precautions. 1 ill., 900 words. Municipal Journal and Public Works, June 28. 10 cts.

Stresses in Concrete Roads. Experiments made by Bureau of Public Roads possibly explain reasons for many cases of cracking and failure. 1,000 words. Municipal Journal and Public Works, June 28. 10 cts.

Cracks in Concrete Roads. Editorial discussion of cause or causes, with reference to experiments made by the Bureau of Public Roads. 200 words. Municipal Journal and Public Works, June 28. 10 cts.

Concrete in Road Construction. Culverts and Bridges. Fine aggregate should be tested for organic impurities, gradation (sieve analysis), mortar strength and volume of silt or loam; field tests of fine aggregate; Deval abrasion test. Paper before Canadian Good Roads Congress, by H. Eltinge Breed, consulting engr., N. Y. C. 3,000 words. Good Roads, June 21. 10 cts.

Stone Block:

Design and Construction of Modern Granite Block Pavements with Special Reference to Practice in Borough of Manhattan. Types of granite pavement; advantages; dimension of blocks; filling joints; preparation and use of mastic; Durax pavement. By C. M. Pinckney, chief engr., Dept. of Public Works, Borough of Manhattan, N. Y. C. 11 ill., 3,200 words. Municipal and County Engineering, June. 25 cts.

How Albany, N. Y., Saved Over \$360,000 in Using Re-dressed Granite Paving Blocks. Cost data. By F. R. Lanagan, city engr., Albany. 1 ill., 900 words. Municipal and County Engineering, June. 25 cts.

Other Kinds:

Macadam Roads. Helped win the war; most used and most abused of any form of highway improvement. Paper before Canadian Good Roads Congress, by A. P. Sandles, secretary, National Crushed Stone Ass'n, Columbus, O. 3,300 words. Canadian Engineer, June 12. 15 cts.

Surface Treatment of Gravel Roads with Refined Tar. Tars used for this purpose actually penetrate into the gravel, forming crust over the surface, that has considerable strength; roads should not be treated immediately after construction. By P. P. Sharples. 1,200 words. Good Roads, June 7. 10 cts.

Use of Calcium Chloride as Dust Preventive on Gravel Roads. Excellent results obtained by Connecticut Highway Commission; methods employed described by W. Leroy Ulrich, supt. of repairs, in Public Roads, from which this article is abstracted. 1,000 words. Engineering and Contracting, June 4. 15 cts.

Road Surfacing with Sand Clay from Salt Flats. Abstracts from article in Public Roads by R. H. Phillips, engr. of Aransas county, Texas, on methods of using this material and results. 1,800 words. Engineering and Contracting, June 4. 15 cts.

Methods of Constructing Roads Through Sandhill Regions. Abstract of paper before Nebraska Road Institute, by Paul E. Brown. 800 words. Engineering and Contracting, June 4. 15 cts.

Is Experimenting with New Designs of Pavement Justifiable? Editorial comment on waste of public money in repeating experiments or experimenting on too large a scale. 800 words. Engineering and Contracting, June 4. 15 cts.

The Pavement of the Future. Some one type may be selected for heavily-traveled roads; requisites of the ideal pavement as listed in Blanchard's "American Highway Engineers' Handbook." By L. E. Addis. 2,300 words. Good Roads, June 7. 10 cts.

Organization and Finance.

Federal Aid Road Work. Roads having combined mileage of 750.87, covered by 124 projects, approved for federal aid during May. 300 words. Municipal Journal and Public Works, June 14. 10 cts.

Views of Secretary Houston Regarding Creation of Federal Highway Commission. Reply to a city chamber of commerce requesting his views on subject. 2,200 words. Engineering and Contracting, June 4. 15 cts.

Secretary Houston's Opposition to a Federal Highway Commission. Editorial discussion of the Secretary's statement, given in full in this issue; arguments weak without exception. 800 words. Engineering and Contracting, June 4. 15 cts.

Illinois State Highway Department. Enlargement and reorganization found necessary because of enormous amount of highway construction to be begun. 150 words. Municipal Journal and Public Works, June 28. 10 cts.

Methods of Financing Highway Improvements. Excellent summary of various methods used in this country, embodied in committee report to American Road Builders' Ass'n, by J. E. Pennybacker, chief of Management, U. S. Bureau of Public Roads. 2,000 words. Engineering and Contracting, June 4. 15 cts.

Contract and Force Account.

Large Construction Companies Shun Road Work. Politics, narrow business

practices and petty contract restrictions are objectionable to construction managers of large affairs. By C. S. Hill, assoc. editor. 2,200 words. Engineering News-Record, June 12. 20 cts.

Economic Status of Guarantees for Pavements on Roads and Streets. Three types of guarantees; engineer responsible to community. Committee report of American Road Builders' Ass'n. 2,500 words. Canadian Engineer, June 12. 15 cts.

Experience of the New York Commission of Highways in Doing Its Own Construction Work on Unfinished Contracts. 800 words. Municipal and County Engineering, June. 25 cts.

Force Account Work by New York State Highway Department. Interesting details regarding work on 67.89 miles of highway, carried on during 1918 by forces of the N. Y. state highway commissioner, given by E. A. Bonney, supervising engr. in charge of the work. 600 words. Engineering and Contracting, June 4. 15 cts.

Force Account Work in New York State. Review of results secured by carrying out with highway department forces contracts abandoned by defaulting contractors. 1,000 words. Good Roads, June 28. 10 cts.

Road Machinery. American officials must face high wages for several years, hence need for labor-saving machinery; selection of material should be based upon character of work, specification requirements, portability of plant, transportation facilities, etc. Paper before Canadian Good Roads Congress, by A. H. Blanchard, consulting engr., N. Y. C. 3,000 words. Engineering and Contracting, June 4. 15 cts. 3,500 words. Municipal and County Engineering, June. 25 cts. 3,000 words. Good Roads, June 7. 10 cts.

Miscellaneous:

Practical Advice to Road Superintendents and Municipal Councils. Preparing the plan; carrying out the work. By A. Fraser, ass't chief engr., dept. of highways, Quebec. Paper before Canadian Good Roads, 3,300 words. Canadian Engineer, June 12. 15 cts.

Highway Requirements for 20th Century Transportation, with Special Reference to New Jersey Practice. Traffic uncertainties; alignment, grades and width; bridges and railroad grade crossings. By Wm. G. Thompson, state highway engr., Trenton. 2,000 words. Municipal and County Engineering, June. 25 cts.

Road Building in Quebec. Will not end until at least 40,000 miles have been improved; what French and English genius have jointly accomplished in highway work. By Sir Lomer Gouin, Premier of Quebec Province. 1,000 words. Canadian Engineer, June 5. 15 cts.

Good Roads and Agriculture. Roads provide vital link between farm and market; provincial government assistance. Address of welcome to the Canadian Good Roads Congress, by Hon. G. S. Henry, Minister of Agriculture, Province of Ontario. 1,500 words. Canadian Engineer, June 5. 15 cts.

Highway Design and Construction Papers Read Before Canadian Road Congress. Design and Construction of Hot-Mix Asphalt Pavements, by F. P. Smith, Dow & Smith, N. Y. C.; Testing Aggregates for Concrete Roads, by H. Eltinge Breed, N. Y. C. Factors Influencing the Selection of Road Plant, by A. H. Blanchard, N. Y. C. 5,000 words. Engineering News-Record, June 5. 20 cts.

Beautifying Highways. Vitally important; planting trees, shrubbery and flowers calls for only small expenditure. By J. A. Hazlewood, chairman, Wisconsin Highway Commission. 2,500 words. Good Roads, June 21. 10 cts.

Yielding Barriers Close Roads at Drawbridges. Impact of vehicles absorbed by traveling gate to stop motor trucks, and by cables to stop automobiles. 2 ills., 1,500 words. Engineering News-Record, June 12. 20 cts.

White Bricks Mark "Danger Lines" on Pavement. Employed by United Railroads of San Francisco where street cars round loops. 1 ill., 500 words. Engineering and Contracting, June 4. 15 cts.

Location of Sub-surface Pipe Lines to Conserve Street Pavements. Beginning now in unpaved areas; placing gas mains under sidewalks. By H. M. Adams, ass't engr., Borough of Bronx, N. Y. C. 1,400 words. Municipal and County Engineering, June. 25 cts.

Winter Roads. Problem of snow removal important; rolling not always satisfactory; snow fences effective; equipment used in Outremont. Paper before the Canadian Good Roads Congress, by A. Lalonde, ass't engr., Outremont, P. Q. 1,500 words. Canadian Engineer, June 5. 15 cts.

Opening and Restoring Pavements. Report of National Highway Traffic Association Committee. 900 words. Good Roads, June 28. 10 cts.

SEWERAGE AND SANITATION.

Some Unusual Sewerage Problems and How They Were Solved at Ocean Beach, N. Y. Influence of ground water on design; construction of Imhoff tank; locating leaks and grouting under pressure. By A. J. Provost, Jr., consulting engr., N. Y. C. 6 ills., 3,000 words. Municipal and County Engineering, June. 25 cts.

Moore Park Drainage System, Toronto. Construction commenced in 1917 and completed in February, 1919. Information and drawings furnished by the contractor's engineer, H. F. Barker. 4 ills., 1,000 words. Canadian Engineer, June 5. 15 cts.

Some Broader Aspects of Rain Intensities in Relation to Storm Sewer Design. Relation of thunderstorms to excessive rain intensities; results of investigations by writer and conclusions thus far reached. By R. E. Horton, hydraulic engr., Albany, N. Y. 5 ills., 4,500 words. Municipal and County Engineering, June. 25 cts.

Chicago's Relief Sewers. Method of locating sewers; alternate plans being considered; building intercepting sewers. By C. D. Hill, engr. for construction division, board of local improvements, Chicago. 3 maps, 4,000 words. Engineering World, June 1. 15 cts.

Chicago's Standard of Sewer Construction. Reasons for Chicago's superiority in sewer construction; some factors which make for low maintenance cost. By C. D. Hill, engr. for construction division, board of local improvements, Chicago. 2,700 words. Engineering World, June 15. 15 cts.

Mosquito Control. Methods developed at army camps and by progressive communities. By W. D. Pierce, Bureau of Entomology, U. S. Department of Agriculture. 4 ills., 2,600 words. American City, June. 35 cts.

Clean Catch-Basins for Akron. By H. S. Morse, director of public service, Akron. 500 words. American City, June. 35 cts.

Trade-Waste Treatment Studies in Wisconsin. Wide range of investigations made to help lessen water pollution; treatment methods; test plant at Milwaukee. By E. J. Tully, state sanitary engr., Madison, Wis. 1,300 words. Engineering News-Record, June 12. 20 cts.

WATER SUPPLY.

A. W. W. A. Convention.

American Waterworks Association. 39th annual convention in Buffalo had record attendance. 2,000 words. Canadian Engineer, June 19. 15 cts.

American Waterworks Association. Remarkable history of organization from small beginning of 20 members in 1881, to present importance and influence. 16 ills., 7,000 words. Fire and Water Engineering, June 4. 15 cts.

The Local Sections. Historical review of the various sections so far formed by members of American Water Works Association. 16 ills., 5,000 words. Fire and Water Engineering, June 4. 15 cts.

American Waterworks Convention. Doings of the 39th convention of the

association; business transacted, reports of committees, paper and discussions, and "round table" and "question box" exchanges of experiences. 4,000 words. June 21. 4,200 words, June 28. Municipal Journal and Public Works. 10 cts.

The American Water Works Association. Editorial comment on retarded growth of membership and official measures proposed for meeting the situation. 1,000 words. Engineering News-Record, June 19. 20 cts.

Progress and Problems in the Field of City Water Supply. Abstracts of papers before the American Water Works Association at Buffalo. The "Uniflow" Pumping Engine," by D. A. Decrow, chief engr., Worthing Pump & Machinery Co., Harrison, N. J.; Advance in Chlorination and Its Effect on Typhoid Fever, by John Kienle, sanitary engr., Electro-Bleaching Gas Co., N. Y. C.; Effect of the War Upon Water-Works Revenues and Expenses, by Leonard Metcalf, consulting engr., Boston, Mass.; Reduction of Water Consumption by Pitometer and Inspection, by Geo. C. Andrews, water commissioner, Buffalo, N. Y.; Need for Standardization of Flanges for Light Cast-Iron Pipe, by John Knickerbocker, president of the Eddy Valve Co., Waterford, N. Y. 3 ills., 2 tables, 5,000 words. Engineering News-Record, June 19. 20 cts.

Pumping:

Design of Motor-Driven Centrifugal Pumps. Typical characteristic curves for different types under identical conditions; non-overloading pump shows maximum efficiency when motor is under maximum load; induction motor designed under full load conditions is most economical drive. By A. T. Clark, ass't engr., Hydro-Electric Power Commission of Ontario. 5 ills., 1,700 words. Canadian Engineer, June 19. 15 cts.

Louisville's New Pumping Station. To house latest increase to pumping plant; thirty million gallon vertical, triple fly-wheel pump; contractor's methods and plant used in sinking caisson and erecting building. 8 ills., 3,500 words. Municipal Journal and Public Works, June 7. 10 cts.

Pumping Station at Aylmer, Ont. Description of 4-in., 2-stage, motor-driven domestic pump and 8-in. 3-stage gasoline-engine-driven pump; average cost of pumping and previous average cost. By H. L. Shepherd, ass't engr., Hydro-Electric Power Commission of Ontario. 2 ills., 1,000 words. Canadian Engineer, June 5. 15 cts.

The "Uniflow" Pumping Engine. Outstanding features are simplicity of construction, low cost of production, high duty or economy in use of steam. Paper before American Water Works Ass'n, by D. A. Decrow. 2 ills., 1,500 words. Canadian Engineer, June 19. 15 cts.

Helical Gears Solve Cornwall's Pumping Problem. High speed single-stage centrifugal pumps are driven by low speed hydraulic turbines, with pumping efficiency of 73% including gear loss; direct drive would have required 14 stages, causing sacrifice of present efficiency. By R. N. Austin, gen. mgr., Turbine Equipment Co., Ltd., Toronto. 5 ills., 2,500 words. Canadian Engineer, June 5. 15 cts.

New Coal-Handling Plants for Philadelphia Water Works. General and detailed designs of three systems supplying a total of 16 boilers with a total boiler capacity of 7,400 h. p.; costs reduced as compared with old methods. By H. R. Cady, Bureau of Water, Philadelphia. 3 ills., 1,500 words. Engineering News-Record, June 5. 20 cts.

Steam Turbine-Driven Centrifugal Pumps. Advantages for city water supply; superiority found in its economic advantages very useful for small stations. 3 ills., 1,300 words. Fire and Water Engineering, June 4. 15 cts.

Centrifugal Pumps at the Chicago Water Works Plants. Electric power more satisfactory than steam; two 40,000,000-gallon pumps with 1,100-h. p. motors being installed. 1,000 words. Engineering News-Record, June 5. 20 cts.

Pumping Plant at Sault Ste. Marie, Ont. Water drawn from power canal, gravitates to pumping station and passes through two Jennings band screens, which move slowly and automatically discharge screenings into hoppers. By R. O. Wynne-Roberts, consulting engr., Toronto. 1 ill., 700 words. Canadian Engineer, June 5. 15 cts.

Meters and Waste:

Water Meter Data. Information furnished by nearly 400 waterworks super-

intendents; location, reading, testing and maintaining of meters; cost of meter service. 800 words, 13½ pages tables. Municipal Journal and Public Works, June 7. 10 cts.

Reduction of Water Consumption by Means of Pitometer Survey and Constant Inspection. Brief description of pitometer survey; determining consumption by sub-divisions. Excerpts from paper before American Water Works Ass'n, by Geo. C. Andrews, water commissioner, Buffalo. 3,000 words. Canadian Engineer, June 19. 15 cts.

Why Meter? Reasons for completely metering municipal water supplies. 2 ills., 800 words. American City, June. 35 cts.

Metering and Water Consumption. Effect of meters on amount of water consumed by community; methods of controlling water waste; adoption of sewerage increases water consumption. By H. P. T. Matte, chief sanitary engr., Illinois State Department of Public Health. 1 ill., 2,000 words. Fire and Water Engineering, June 11. 15 cts.

The Lanham Manograph. A recording pitot tube meter; its use in measuring flow of water through mains of distributing systems, discharge mains of pumps, and all forms of conduits carrying pressure. 1 ill., 800 words. Fire and Water Engineering, June 4. 15 cts.

Universal Meterage. Some interesting replies to inquiry on subject; remarkable unanimity of opinion in favor of system; all sections of country represented. 2,500 words. Fire and Water Engineering, June 4. 15 cts.

The Meter Department. Methods for its efficient operation; policy of advising consumer on water works matters advocated; repairing and testing meters; frequency of testing; overstating an important question. By H. M. Ely, supt. of the Inter-State Water Co., Danville, Ill. 2 ills., 1,400 words. Fire and Water Engineering, June 4. 15 cts.

Reduction of Water Consumption by Means of Pitometer Survey and Constant Inspection at Buffalo, N. Y. By Geo. C. Andrews, water commissioner, Buffalo. 4,000 words. Municipal and County Engineering, June. 25 cts.

Water-Waste Education by Bulletins. Issued periodically by water department and circulated particularly among less well informed consumers. 500 words. Engineering News-Record, June 5. 20 cts.

Water-Meter Practice and Testing at Buffalo, N. Y. Special testing bench for large meters; cubic-foot pail for skeptical householders; non-freeze settings. By C. L. Lund, hydraulic engr. in charge of Buffalo meter shop. 1 ill., 1,300 words. Engineering News-Record, June 5. 20 cts.

Women Water-Waste Inspectors at Baltimore, Md. Men replaced with satisfactory results; women under direction of pitometer engineer paid \$2.76 a day. By W. E. Lee, water engr., Baltimore. 3 ills., 600 words. Engineering News-Record, June 5. 20 cts.

Purification:

Disinfection of Water Supplies. Data concerning use of chlorine for public water supplies; incompleteness of typhoid statistics; causes of typhoid other than water. 1 table, 1 chart, 2,000 words. Municipal Journal and Public Works, June 14. 10 cts.

Disinfection of Water Supplies. Opinions of its value by waterworks officials in all sections of country; used alone as sole guard against typhoid, or in connection with filtration as additional safeguard. 1,200 words. Municipal Journal and Public Works, June 7. 10 cts.

Progress of Water Disinfection in Maryland. Need shown by survey by State Health Department; general description of plants and of results of chlorination. By R. B. Morse and H. R. Hall, chief engr. and ass't chief engr., respectively, of Maryland Department of Health. 3,200 words. Municipal Journal and Public Works, June 7. 10 cts.

Chlorination in Michigan. Applied to 90% of the water of public supplies; comments by state sanitary engineer on its uses and effects. 2,300 words. Municipal Journal and Public Works, June 7. 10 cts.

Is the Chlorination of Water Supplies Worth While? Typhoid fever morbidity rates give the answer; filtration and chlorination both essential. 1,200 words. American City, June. 35 cts.

Buffalo Water Supply, with Special Reference to the Filtration Problem. Chlorinating apparatus; standards of

safety; suggested filter snc. By H. F. Wagner, chemist, Bureau of Water, Buffalo. Paper before the American Water Works Ass'n. 3,000 words. Canadian Engineer, June 19. 15 cts.

Design of New Filters Influenced by Experience Gained from the Operation of Original Filters at the Minneapolis Plant. By L. I. Birdsall, supt. of purification division, Minneapolis Water Dept. 2,000 words. Municipal and County Engineering, June. 25 cts.

Testing Stations for Determining Critical Factors for Water Purification Plant Design. Excerpts from paper before the Illinois section of American Water Works Ass'n. by W. T. McClenahan and R. S. Rankin, ass't engrs., Pearce & Greeley, Chicago. 2,500 words. Canadian Engineer, June 5. 15 cts.

Combined Aerator and Mixer for Colloidal Water. Odor, color, taste and turbidity in underground water from cavernous limestone make treatment difficult. 4 ills., 1,000 words. Engineering News-Record, June 19. 20 cts.

The Numerical Interpretation of Bacteriological Tests. Theory of probabilities applied to sanitary engineering, with particular reference to results obtained in studies of water and sewage. By M. F. Stein, civil engr., Chicago, Ill. 5 ills., 3,500 words. Engineering News-Record, June 5. 20 cts.

Softening a Municipal Water Supply for Domestic Use. Hinsdale, Ill., has five years of successful treatment to its credit. By H. H. Bristol, supt. of waterworks, Hinsdale. 1 ill., 300 words. American City, June. 35 cts.

Typhoid Prevention:

Eternal Vigilance the Price of Freedom from Water-Borne Typhoid. Epidemic at Herkimer, N. Y., a warning. By T. Horton, chief engr., N. Y. State Department of Health. American City, June. 35 cts.

Maintaining Small Watersheds. Reference to report of city engineer of Little Falls, N. Y., John E. Foote, in which he described work on watersheds of several sources of supply. 200 words. Municipal Journal and Public Works, June 7. 10 cts.

Supervision of the Public Water Supplies of New York State. Activities under public health law; scoring and grouping water supplies; typhoid death rate greatly reduced. By T. Horton, chief engr., and E. S. Chase, ass't engr., engrg. division, N. Y. State Department of Health. 1,700 words. American City, June. 35 cts.

Protection and Immunity from Typhoid. Editorial discussion of theory that by minimizing danger of typhoid, we are lessening our immunity; "summer typhoid" and unsanitary conditions at summer resorts. 500 words. Municipal Journal and Public Works, June 7. 10 cts.

Wells:

Artesian Well Experience at Baton Rouge, La. Larger well casing gives increased flow; temperature a factor in 62 days. 1 ill., 1,000 words. Engineering News-Record, June 12. 20 cts.

Features of the Well System of the Dayton, O., Water Works. Four groups of wells; overcoming air trouble. By H. C. Wight, supt., Division of Water, Dept. of Public Service, Dayton. 800 words. Municipal and County Engineering, June. 25 cts.

How Vinton, Ia., Obtained a Dual System of Water Supply. Deep wells and air-lift pumps; water rates. By J. H. Dunlap, asso. professor of hydraulics and sanitary engrg., University of Iowa, Iowa City. 3 ills., 1,000 words. Municipal and County Engineering, June. 25 cts.

Relation of a Private Well to Typhoid. Average well a public menace; results of well water tests in Indiana. By H. E. Barnard, state food and drug commissioner, Indiana. 1 ill., 2,200 words. American City, June. 35 cts.

Design and Tests of Highly Efficient Air-Lift Installation at Fort Bliss, Tex. Novel foot piece, well proportioned eduction pipe, and special tanks give 51.9% air-lift efficiency; overall efficiency 28.6%; test figures and operating costs. By Capt. J. F. Brown, Engrg. Branch, Construction Division of the Army, Kansas City, Mo. 3 ills., 2,800 words. Engineering News-Record, June 5. 20 cts.

Miscellaneous:

Waterworks Office Appliances. Addressing machines and adding machines found in large percentage of offices;

other appliances used; waterworks as a business. 1,100 words. Municipal Journal and Public Works, June 7. 10 cts.

Laying Water Mains in Alleys. Arguments in favor and objections; proved impractical in Davenport. By C. R. Henderson, manager, Davenport Water Works Co., Davenport, Ia. 1,200 words. Municipal and County Engineering, June. 25 cts.

Break in Water Mains. Organization, equipment, and records needed to control flow from such breaks; subways have complicated problem; main factors to be considered in handling breaks in mains and methods to be employed. By Wm. W. Brush, deputy chief engr., dept. water supply, gas and electricity, N. Y. C. 1 ill., 3,000 words. Fire and Water Engineering, June 4. 15 cts.

Cement Joints for Cast-Iron Water and Gas Mains at Vallejo, Calif. Satisfactory experience in use of cement instead of lead reported by Philip Schuyler, ass't engr. of Mare Island project of U. S. Housing Corporation. 1,100 words. Engineering News-Record, June 19. 20 cts.

An Interesting Comparison. Bids on contract for proposed gravity water supply system at Newark, N. Y., compared with those of similar contract at Le Roy, N. Y., awarded four years ago; prices in both cases remarkably low. 1,000 words. Fire and Water Engineering, June 11. 15 cts.

Study of Revenue from Sale of Water to Metered Domestic Consumer. New England Water Works Association form based on service and output charge alone rational and equitable; basing revenue estimates on unregistered water leads to error. By Philip Burgess, engr., Columbus, O., before the Indiana Sanitary and Water-Supply Ass'n. 3 ills., 2,300 words. Engineering News-Record, June 5. 20 cts.

Municipal Ownership of Waterworks. Editorial discussion of Mr. Metcalf's paper before the American Waterworks Association, appearing in this issue. 400 words. Municipal Journal and Public Works, June 21. 10 cts.

The War and the Waterworks. Effect of the war period—1914 to 1918—and public control upon the waterworks of the United States. By Leonard Metcalf, of the engrg. firm, Metcalf & Eddy, Boston. 4,000 words. Municipal Journal and Public Works, June 21. 10 cts.

The War and the Water Works. Tables and diagrams presenting data referred to in the discussion of this subject last week, by Leonard Metcalf. 5 ills., 2 tables, 500 words. Municipal Journal and Public Works, June 28. 10 cts.

Some New York State Water Works. Several plants in western and central sections of state, described by superintendents and illustrated. Jamestown, by Lyman P. Hapgood, supt.; Watertown, by J. W. Phippen, supt.; Cohoes, by J. T. Gorman, commissioner of public works; Oswego, by Wm. A. McCaffrey, supt.; Schenectady, by T. M. Townsend, supt.; bureau of water; Auburn, by J. W. Ackerman, chief engr. and supt.; Seneca Falls, by A. N. French, supt.; Elmira, by H. M. Beardsley, general mgr. 11 ills., 8,000 words. Fire and Water Engineering, June 4. 15 cts.

New Waterworks Systems for Amherstburg and Ojibway, Ont. Quantity of water required and quality of water; filtered water delivered to Amherstburg by 3 motor-driven centrifugal pumps; design of Ojibway plant. By C. W. Tarr, vice-pres., Morris Knowles, Ltd., Windsor, Ont. 2,000 words. Canadian Engineer, June 5. 15 cts.

Observations on Water Supply in Russia. Large cities have fairly well-equipped water works, smaller places often have no public supply. By Geo. C. Whipple, prof. of sanitary engrg., Harvard University. 2 ills., 1,100 words. American City, June. 35 cts.

Ottawa's Water Supply. Description; high per capita consumption attributed to number of government buildings; new pumping plant, placed in operation in 1917; overland piping system. By W. E. MacDonald, city water works engr. 3 ills., 1,500 words. Fire and Water Engineering, June 4. 15 cts.

Ancient, War-Time and Present Water-Supply in Jerusalem. How Gen. Allenby's engineers brought water from Nile across desert; ancient and new permanent water-supplies of Jerusalem; important part played by caterpillar tractors and modern pipe. By H. Y. Carson, Central Foundry Co., N. Y. C., lately with American Red Cross Commission. 5 ills.,

2,000 words. Engineering News-Record, June 5. 20 cts.

Public Control of Water. Editorial reference to penalty imposed upon Jersey City by state for using from Rockaway river more than the 100 gallons per day per capita allotted to it. 250 words. Municipal Journal and Public Works, June 14. 10 cts.

The 25-Mile Gravity Pipe Line of Everett, Wash. Project designed by Burns & McDonnell, of Kansas City. By W. A. Scott. 14 ills., 3,500 words. Engineering World, June 15. 15 cts.

Safeguarding Municipal Water Supplies by Tree Growth. Trees the best crop for reservoir lands; method of planting and seeding. By P. D. Kelleter, Forest Service, Department of Agriculture. 3 ills., 1,800 words. American City, June. 35 cts.

LIGHT AND POWER.

Hydro-electric Power:

Hydro-Electric Development on Nipigon River. Five units will be installed, totalling 60,000 h. p., at Cameron's Pool, near Port Arthur, Ont.; concrete dam 200 feet long, 43 feet high; scroll cases to be moulded in concrete. 8 ills., 1,500 words. Canadian Engineer, June 12. 15 cts.

Ontario Power Co.'s Plant Extension. Rapid construction of new unit at Niagara Falls was necessary to supply demands. By H. A. Gardner. 9 ills., 4,500 words. Engineering World, June 1. 15 cts.

Structural Details of Plant Extension at Niagara Falls. Plant extension by hydro-electric power commission to increase capacity by 40,000 h. p.; structural features; equipment involved. 9 ills., 3,500 words. Electrical Review, June 21. 30 cts.

Water Conservation for Massachusetts. Discussion before legislative committee by public officials emphasizes importance of utilizing water power now wasted. 600 words. Electrical World, June 14. 15 cts.

Some Hydro-Electric Developments of Moderate Size in New England. Description of plant at Rumford Falls on Androscoggin River. 5 ills., 2,200 words. Engineering World, June 15. 15 cts.

Economical Section of Water Conduit for Power Development. Formula for best slope and size of conduit is deduced, which takes into account construction costs, value of power recovered, rate of returns expected on expenditures, and other physical conditions of problem. Excerpt from paper before American Society of Mechanical Engineers, by C. T. Hutchinson, consulting engr., N. Y. C. 2 ills., 2,000 words. Canadian Engineer, June 19. 15 cts.

Gas:

Municipal Ownership of Gas Properties. Individualism and democracy are not in harmony with conditions surrounding public operation of utilities. By Walton Clark, Philadelphia. 1 ill., 2,500 words. Gas Age, June 16. 20 cts.

Causes Necessitating Increased Gas Rates. Analysis of the effect of surplus gold, increased expenses and decreased supply of material, prepared for Natural Gas Association. By F. C. Hamilton, Pittsburgh. 2 ills., 3,000 words. Gas Age, June 16. 20 cts.

The Law with Regard to Consumers Stealing Gas. Digest of American and English decisions by upper courts, upon which law relating to theft of gas is based. 2,700 words. Gas Age, June 16. 20 cts.

Street Lighting:

A Modern Ornamental Street Lighting System. Now in course of construction in Cincinnati, extending over seven miles of streets. 5 ills., 1,000 words. American City, June. 35 cts.

Chicago's Tunnels for Electric Light and Power Cables. Details of Commonwealth Edison Co.'s tunnels; construction methods employed; relative advantages of tunnels and conduit. By G. B. Springer, civil engr., Commonwealth Edison Co. 10 ills., 3,500 words. Electrical Review, June 21. 30 cts.

Miscellaneous:

Reinsulation of Large Generators. To provide against interrupted service on its lines during period of heavy winter peak loads, Milwaukee company follows this practice; engineering experience gained in handling four machines totalling 43,000 K. W. 1 ill., 2,500 words. Electrical World, June 21. 15 cts.

Comparison of Mechanical Stokers. Classification; salient features of the different stokers; influence of stoker upon draft, combustion chamber, etc. By Rob. June, mechanical engr. 3 ills., 3,000 words. Electrical Review, June 21. 30 cts.

220,000-Volt Transmission an Immediate Possibility. Especially adapted to bringing large blocks of power from coal mines and water powers to industrial markets; technical problems not serious; some research necessary. 5 ills., 3,700 words. Electrical World, June 28. 15 cts.

National Planning for Electric Power. Efficiency must lower cost and power and human resources must be conserved; Secretary Lane's proposed survey is economic and will measure present and future power requirements. By Dr. Geo. Otis Smith, director U. S. Geological Survey. 3 ills., 2,000 words. Electrical World, June 7. 15 cts.

STREET CLEANING AND REFUSE DISPOSAL.

Vacuum Cleaning the Streets of San Diego. Machine mounted on motor truck; has two engines, one to run truck and the other to operate broom. By W. S. Draper, foreman, Operating Department, Bureau of Streets. 1 ill., 300 words. American City, June. 35 cts.

Lower Refuse Collection Wagons. Editorial on the cruelty to ash and garbage collectors in compelling them to lift containers above their heads to empty them into the collecting wagons. 300 words. Municipal Journal and Public Works, June 28. 10 cts.

Refuse Collection in Rochester. Present conditions and practices and recommended changes; organization of force; equipment and methods employed; report of Bureau of Municipal Research. 2 ills., 3,000 words. Municipal Journal and Public Works, June 28. 10 cts.

Waste Reclamation: A New Municipal Function. War methods which caught the dollar at the dump; war-time necessity becomes community blessing. By H. L. Baldensperger, chief, Waste Reclamation Service, U. S. Department of Commerce. 1,500 words. American City, June. 35 cts.

FIRE DEPARTMENT.

Private Fire Protection. Report of Committee of American Waterworks Association giving recommendations for procedure in installing and charging for private fire devices. 2,700 words. Municipal Journal and Public Works, June 21. 10 cts.

Private Fire Services. Editorial reference to the report in last week's and the discussion in this week's issue on the subject. 150 words. Municipal Journal and Public Works, June 28. 10 cts.

A 35-Mile Fire Protection Line. Extension to Philadelphia high pressure service; accepted after severe and unusual tests; results obtained and service given satisfactory. By C. W. Presdee. 2 ills., 1,300 words. Fire and Water Engineering, June 4. 15 cts.

San Francisco's High Pressure Fire Service. Formerly maintained as reserve supply, now used as main fire-fighting system; difficulties of high pressure controlled by use of reducing valve; description. 4 ills., 1,400 words. Municipal Journal and Public Works, June 21. 10 cts.

"My Hardest Fought Fire." Chiefs from every section of this country and Canada describe their most difficult instance of fire fighting; methods employed and problems met; bravery and endurance of men emphasized. 8 ills., 8,000 words. Fire and Water Engineering, June 18. 15 cts.

The Fire Engine. Considered in its relation to essentials of fire fighting; brief historical sketch of development of apparatus; caliber system of standard fire streams; losses in fire hose. By C. H. Fox, Cincinnati. 3,500 words. Fire and Water Engineering, June 18. 15 cts.

New Type Rotary Fire Pump. Produced by the International Motor Co.; lateral intake and discharge; hardened steel pilot gears; low pressure packing; record at Chicago fire. 2 ills., 1,200 words. Fire and Water Engineering, June 18. 15 cts.

Fire Prevention Increasingly Necessary. A series of suggestions on experiences in Indianapolis. By J. H. Hilkens, director of fire prevention, Indianapolis. 1 ill., 3,000 words. American City, June. 35 cts.

Personal Liability for Fires. The proper

placing of responsibility for fires caused by negligence; laws on subject, and interpretation; compulsory removal of dilapidated buildings that are menace. By J. G. Gamber, state fire marshal of Illinois. 1 ill., 1,500 words. June 4. 1,500 words. June 11. Fire and Water Engineering, 15 cts.

Kansas City Fire Department. The interesting history of the convention city's fire-fighting forces; the two international teams; record of steady development in the department under leadership of capable officers. 12 ills., 4,500 words. Fire and Water Engineering, June 18. 15 cts.

Observations and Experiences. Fire captain should profit by happenings of daily routine; necessity of knowing buildings in his district; vital importance of frequent inspections; avoid water damage. By Capt. C. W. Tisdale, Ladder Co. No. 5, Jersey City Fire Department. 2,000 words. Fire and Water Engineering, June 11. 15 cts.

STRUCTURES AND MATERIALS.

The Organization of a Standard Municipal Testing Laboratory. Should be owned by every progressive municipality; duties and functions of laboratory; arrangement and equipment. By J. O. Preston, asst' engr., Bureau of Municipal Research, Rochester, N. Y. 1 ill., 4,200 words. Engineering and Contracting, June 4. 15 cts.

Aggregates Too Coarse in Bureau of Standards Tests. Most of aggregates are of unusual gradings which were advised against in use of fineness-modulus method. By Duff A. Abrams, prof. in charge of the Structural Materials Research Laboratory, Lewis Institute, Chicago. 2,500 words. Engineering News-Record, June 12. 20 cts.

Tests of Two Recent Theories for Proportioning Concrete. Fineness-modulus and surface-aggregate methods, both of which depend on water-cement ratio, do not seem to insure the necessary workability of mix. By G. M. Williams and Watson Davis, asso. engr. and asst' engr., respectively, U. S. Bureau of Standards, Washington, D. C., 6 ills., 4,500 words. Engineering News-Record, June 12. 20 cts.

Surface Aggregate or Fineness-Modulus for Concrete. Prof. Duff A. Abrams defends fineness-modulus theory of proportioning concrete and gives his objections to the surface-area theory proposed by L. N. Edwards. Letter by L. N. Edwards, senior highway bridge engr., Bureau of Public Roads, Washington, D. C., and reply by D. A. Abrams, prof. in charge, Structural Materials Research Laboratory, Lewis Institute, Chicago. 5,000 words. Engineering News-Record, June 19. 20 cts.

Tests Do Not Bear Out Surface Area Method? Six criticisms of Capt. Edwards' theories; areas of finest particles cannot be satisfactorily dealt with; separate treatment for each aggregate; laborious computations necessary; not clear how method can be applied to simplest problems. By Prof. Duff A. Abrams. 4,000 words. Canadian Engineer, June 26. 15 cts. 5,000 words. Engineering and Contracting, June 25. 15 cts.

Studies in Surface Area Proportioning Method. Hydro-electric power commission of Ontario satisfied that surface area method of proportioning materials of mortars and concretes is correct in principle; fineness-modulus varies as surface area; not necessary to obtain actual surface area of aggregate. By R. B. Young, asst' laboratory engr., Hydro-Electric Power Commission of Ontario. 5 ills., 3,000 words. Canadian Engineer, June 26. 15 cts.

Advantages in Use of Calcium Chloride Solution to Hasten the Setting of Cement Concrete. H. Eltinge Breed describes results of tests by the N. Y. Commission of Highways. 1 ill., 300 words. Municipal and County Engineering, June. 25 cts.

Tests of New York State Department in Use of Calcium Chloride in Hastening Setting of Concrete. 1 ill., 300 words. Engineering and Contracting, June 4. 15 cts.

Concrete in Roads, Bridges and Culverts. Fine aggregate should be tested for organic impurities, gradation (sieve analysis), mortar strength and volume of silt or loam; coarse aggregate cannot be tested in field; Deval abrasion test. Paper before Canadian Good Roads Congress by H. Eltinge Breed, consulting engr., N. Y. C. 1 ill., 3,000 words. Municipal and County Engineering, June. 25 cts.

Municipal Freight Handling Dock and Cranes at St. Paul. City now prepared to convey freight from the Mississippi River to storage yards, trucks or railroad cars. 1 ill., 300 words. Engineering News-Record, June 5. 20 cts.

Mechanical Handling the Feature of Concrete Pile Yard. At Norfolk army base both bearing and sheet piles were rapidly turned out in plant at which manual labor was reduced to a minimum; concrete mixed alongside each pile. 8 ills., 2,300 words. Engineering News-Record, June 12. 20 cts.

Construction of New Arch Section of Galveston Causeway. Centrifugal and jet pumps mounted on derrick platforms; permanently lagged steel arch centres; old causeway walls used for cofferdam. 7 ills., 2,000 words. Engineering News-Record, June 19. 20 cts.

Points Requiring Special Observation and Investigation in Bridge Inspection. Secondary stresses due to large gusset plates; effect of position of track on bridge capacity; impact allowance with roadway and sidewalk loads; reduction of strength by corrosion and bolt holes. From paper before Brooklyn Engineers' Club, by H. C. Keith. 3,700 words. Engineering and Contracting, June 25. 15 cts.

TRAFFIC AND TRANSPORTATION.

Motor Trucking:

Relieving Congestion in Baltimore's Delivery District. Comprehensive plan now being carried out is noticeably improving traffic conditions, particularly in the half-mile-square dense business region. By L. H. Palmer, asst' to pres. United Railways and Electric Co. 5 ills., 3,000 words. Electric Railway Journal, June 7. 15 cts.

Electric Trucks and Transportation. Advantages of the electric truck and comparisons with other vehicles; operating data of American Railway Express Company. By E. E. Laschum, gen. supt., American Railway Express Co. 1 ill., 2,800 words. Electrical Review, June 7. 30 cts.

Trucks and Trailers in City Hauling. By their use Boston haulage firm in 3 years has tripled tonnage handled by it. 1 ill., 800 words. Engineering and Contracting, June 4. 15 cts.

Items Which Must Be Considered in Calculating Cost of Truck Operation. Comparing truck cost figures with rail rates; cost keeping. 1,500 words. Engineering and Contracting, June 4. 15 cts.

Street Railways:

Economies of the Skip-Stop. On basis of elimination of one stop per mile, at 1.3 cents per stop, will save \$30,000,000 annually. By J. A. Beeler, consulting engr., N. Y. C. 2,000 words. Electric Railway Journal, June 7. 15 cts.

Zone Fare in Practice in Dublin, Ireland. Remarkably good results secured from two fare increases during 1918, despite reductions in service which were due solely to shortage of coal; five examples given of how to build up traffic by having riders pay for what they choose to take. By Walter Jackson. 9 ills., 4,000 words. Electric Railway Journal, June 7. 15 cts.

The Zone Fare in Practice in West Ham, England. Universal fare tried for a brief period, but abandoned; present differential rates include no half-penny fares for general use; although city is located in the most typical labor borough of London, the average earnings per car-mile exceed 30 cents. By Walter Jackson. 13 ills., 4,500 words. Electric Railway Journal, June 14. 15 cts.

The Zone Fare in Practice in Reading, England. More than 180 rides per passenger per annum in community of 88,000; combination of penny short rides and 1½-penny rides from centre to end of line, with second collection if ride is across town; recent fare increase has been successful in increasing revenue. By Walter Jackson. 11 ills., 3,000 words. Electric Railway Journal, June 28. 15 cts.

Safety Cars Increase Earnings 25% in Terre Haute. 30 one-man cars placed in service in December have also increased car miles 25%, reduced accidents and won popular favor. 4 ills., 3,000 words. Electric Railway Journal, June 28. 15 cts.

Safety Car Is a Live Proposition. This type of equipment in both large and small cities will give better and more frequent service. By P. J. Kealy, pres., Kansas City (Mo.) Railways. 2,700 words. Electric Railway Journal, June 14. 15 cts.

Higher Prices Are Sure to Continue. (Continued on page 30)

NEWS OF THE SOCIETIES

Aug. 26-28.—LEAGUE OF CITIES OF THE THIRD CLASS IN PENNSYLVANIA. Twentieth annual convention, Allentown, Pa. Secretary, Fred H. Gates, city clerk, Wilkes-Barre, Pa.

Aug. 27-29.—VIRGINIA STATE FIREMEN'S ASSOCIATION. Thirty-third annual meeting, Charlottesville, Va. Secretary, E. K. Landis.

Oct. 27-30.—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting, New Orleans, La. Secretary, A. W. Hedrich, 169 Massachusetts ave., Boston, Mass.

Nov. 12-14.—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, New Orleans, La. Secretary, Charles C. Brown, Springfield, Ill.

New York State Conference of Mayors and Other City Officials.

The tenth anniversary meeting of the conference of Mayors and Other City Officials of New York State was held June 10, 11 and 12 in Schenectady, N. Y., the program already announced in these pages being substantially followed. The New York State City Clerks' Association met at the same time.

Opposition to limiting city tax rates, adequate laws for controlling appropriations for city schools, and non-interference by the state and organized groups of city employees in the administration of city affairs were advocated by mayor Walter R. Stone of Syracuse, president of the conference, in his opening address. Mayor Stone expressed the belief that those who are advocating limitations on municipal tax levies are applying the remedy at the wrong place. It is not the power of the city to raise funds that should be limited, he contended, but the activity of those who are trying to force the city to spend beyond its ability. Continuing, he said:

"In my opinion the only way to hold municipal expenditures within bounds is to make every man and woman directly share the burden of taxation, and to stop the activities of groups of municipal employees who use their political influence for purely selfish purposes. By so doing those who advocate costly municipal reforms will be forced to consider the expense their plans involve and which they will have to share, and those officials who are directly accountable to the people for the cost of municipal government may exercise their judgment unhampered by the political influence at home or at Albany of organized groups of civil employees. The interference by the state in the administration of local affairs and the political activity of organized civil employees for selfish purposes are becoming a menace to efficient city government. An adequate home rule constitutional amendment will help to check this interference and a simplified tax system and the elimination of all tax exemptions will make

all directly feel and bear the tax burden."

Mayor Stone summarized as follows the co-operative work of the cities during the last session of the Legislature: "Ninety-six per cent. of the bills the cities opposed through the Conference were defeated and thirty-two per cent. of the measures they advocated are now laws. As a result of the co-operation of the cities mandatory bills, involving an annual tax burden of at least \$25,000,000 were killed, and the two tax bills which we worked hard to have enacted, are laws and will increase the revenue of the cities approximately \$28,000,000 a year."

Mayor Stone characterized as "comprehensive, constructive and conservative" the utility bill which the cities presented last winter for the consideration of the Legislature. "It is not a municipal ownership bill," he declared; "it does not even express a preference for that solution of the utility problem." After describing each of the utility measures which the Legislature refused to pass, Mayor Stone concluded: "The Legislature refused either to grant to the cities authority to solve their utility problems or to adopt the relief sought by the utility companies. It also declined to approve radical municipal ownership proposals or bills which would have permitted a utility to unload on a city. The state has, therefore, done absolutely nothing to relieve the utility situation or to make a solution of the problems possible. These utility ills are, however, still with us, and, so far as traction service is concerned, are becoming more acute in many of our cities. I am satisfied that when the state does not enact a utility law, the plan we have proposed will be the one adopted. The cities cannot be blamed for any lack of effort on their part to secure adequate utility service at reasonable cost. From now on it is the state which must accept the responsibility."

The efficiency of health work in the cities of New York state and the shortcomings of municipal health departments as shown by the investigation by the State Department of Health during the past year were discussed by Dr. Charles C. Duryee. Dr. Duryee announced that the health departments of cities in this state having a population between 50,000 and 175,000 received an average score of 801.5 out of a possible 1,000 points. The lowest score was 565.2 for cities having a population less than 10,000.

The investigation showed that everywhere public health nurses are becoming active agents in assisting health officers. Tuberculosis is being well reported, but whooping cough, mumps and measles are poorly reported. The chief cause for criticism of local health departments is the lack of efficient investigation about sources of infection.

The State Department reports that in some cities infant and maternal welfare work is being done by private organizations with no supervision by the local health department. It also finds that the supervision of milk is progressively improving.

Lack of a uniform system for keeping public health records was criticised by Dr. Duryee, as was also the inadequate clerical forces maintained by many cities. He also severely criticised the accounting systems of health departments. "In a few cities," he said, "it was practically impossible to determine what had been spent for public health work. In some others the health budget contains many items that are not generally conceded as properly belonging to it."

Mayor Midlam, of Rome, presented an interesting report on the year's activities of the State Bureau of Information, operated for the benefit of the members of the conference. A large number of both local and state-wide problems were studied, researches made and reports issued. Particularly effective work was done in a survey of water consumption in the cities and a campaign, afterwards taken up by the Federal Fuel Administration, was started. Besides aiding the cities in their particular problems, the Bureau did much work for committees of the state legislature on bills affecting cities. Requests for information were received from 547 officials of the state and 190 from other states. The bureau sent out 3,015 reports to city officials in the state during the year. Summing up, Mayor Midlam stated these four accomplishments:

1. We have substituted facts for guesses in municipal work in New York State.
2. We have made it impossible for any city official to excuse a waste of public funds on theories and experiments which have failed in other cities.
3. We have made available to all city officials the best thoughts and efforts of every American city, so that failures may be avoided and successes repeated.
4. We present singly and en masse the facts, opinion and advice of the city administrations of the state for the information of the public and as a guide to those who are seeking the solution of state-wide municipal problems, thereby broadening the perspective of the legislators whose views would otherwise be self-centered, and placing above selfish interests the general welfare of all.

"A definite program for definite action looking to the transformation of the street railway business into a full-fledged public utility owned and operated by the community for the public benefit" was the solution of the traction problem proposed by Delos F. Wilcox.

"Although the street railway crisis is acute and the demand for immediate action of some kind or other is pressing," he continued, "still it can be safely predicted that the crisis will not pass and the problem will not be settled until public bodies have the power and the initiative to undertake the performance of this function. It seems strange indeed that the legislature was unable to bring itself to the point of

(Continued on page 29)

INDUSTRIAL NEWS

The Lime Association.

At the first annual meeting of the Lime Association, Mather building, Washington, D. C., held in Pittsburgh, five standing committees were appointed, in accordance with a plan of co-ordination. The general welfare of the lime industry is in the hands of the committees in the matters for which they are respectively responsible.

To facilitate the work of these committees, a member of the staff of the association has been appointed as secretary of each one. It is anticipated that much of the routine can be handled at the general office, thus relieving the chairmen of any unnecessary detail and setting up a logical point of contact between the individual manufacturers and the several chairmen.

The committee on Trade Practices will have for its work the task of changing the merchandising of lime from a buyer's market to a seller's market. Practically all questions concerning quotations, contracts of sale, analyses at destination, protection against decline in prices, uniform cash discount, sales for future delivery, and numerous other knotty problems will be handled by this committee.

The committee on Statistics will determine the best use to be made of the statistics now being gathered from the industry on the production and distribution of products, and such other information as may from time to time be found necessary and desirable for the general benefit of all the manufacturers. The work of this committee will furnish an index for future activities of the association with a view to securing immediate tonnage where most needed.

Other committees are those on Credits and Collections, Uniform Cost Accounting and Accident Prevention and Insurance.

The United States Asphalt Refining Company, 90 West street, New York, which produces "Aztec Asphalt," has issued a useful device for determining the proper grade of asphalt to be used under various conditions of temperature and traffic for various types of construction. The device is in the form of a desk weight and consists of three concentric dials divided as follows: Outer—penetration construction, sheet asphalt, asphaltic concrete (Topeka), asphaltic macadam (hot-mix); intermediate—high temperatures, low temperatures, moderate temperatures; center—heavy traffic, light traffic, moderate traffic. By turning the dials so that the existing combination of conditions is registered, the grade number of the asphalt required is found through openings in the dials.

The indicator is of very neat and

substantial construction and should prove decidedly handy to any engineer or contractor engaged in street construction. To anyone who is responsible for the actual choice of materials, the company will send one of these indicators with its compliments.

New Low Level in Trinidad Asphalt Lake Soundings.

Recent borings made in the famous asphalt lake on the Island of Trinidad have reached a new low level record of 150 feet. The previous record, made in 1893, was 135 feet. On both occasions the asphalt was found to be of uniform character throughout.

These latest attempts to find the bottom of the great mass of asphalt were conducted by George A. MacCready, geologist, at the instance of Dr. Clifford Richardson, who has studied this asphalt wonder for many years. Great difficulties attend any attempt to sound the lake as it is in constant, though almost imperceptible, motion. The pressure of the mass of asphalt at any great depth against the drilling apparatus causes it to bend and the deflection from the perpendicular is so great that further boring is prohibited.

In the borings which have just been made, a core of asphalt was taken by driving a small pipe into the pitch and then withdrawing it with its contained core of pitch. Following this, a pipe of 2-inch diameter was driven to the lowest depth to which the core was taken and the material forced into it by driving was removed by means of a water jet and bit. Another core was taken below the 2-inch pipe in the untouched pipe. The deepest of these borings was taken at the center of the pitch lake, and the asphalt was found to be of uniform character throughout. After completion, this hole was observed to have shifted at the surface 25 feet in six weeks; a survey showed the movement to exist as deep as 100 feet, and there was a suggestion that the direction was reversed at the depth of between 25 and 50 feet. The other borings, not at the center of the lake, shifted to a lesser extent. The movement of the asphalt seems to be similar in many respects to the ascending and descending currents in a kettle of boiling water.

The problem presented is difficult of solution, as it seems to be impossible to find any material which will withstand the bending strain imposed upon it by the pressure of the mass of semi-solid asphalt.

NEWS OF THE SOCIETIES

(Continued from page 28)

passing an act that would put the municipalities in the position, theoretically at least, where they could take hold and help solve this street railway problem."

Regarding the suggested solution by increasing rates, Mr. Wilcox said: "The street railway companies in this country have been flirting with permanent ruin by the pursuit of a rate policy that tends to diminish their usefulness as a public utility by driving away traffic, particularly that portion of it which is from the financial point of view most profitable to the carrier."

Mr. Wilcox expressed the belief that the fundamental defect in the street railway financial policy is the tendency of the private companies to be forever pushing for a bigger capitalization or a bigger capital value. The foundation of the structure of street railway investments in this country, he said, is rotten, and he gave this as one of the fundamental reasons why the business has been unable to weather the storm of war times.

"I do not believe that this is the only reason," he continued, "but I do say that no plan which calls upon the public to pour more revenue and still more into the coffers of the street railways will result in putting them on their feet financially without wrecking them as public utilities, unless this rotten financial foundation is removed and the whole structure rebuilt on a sound basis. I gravely doubt the possibility of getting a street railway business upon a sound basis with its own consent. It feels desperately sick and would like to be cured, but apparently it prefers death to castor oil. I do not anticipate that the committees of electric railway associations and the United States Chamber of Commerce, or even the new federal advisory commission will get very far in helping the bankrupt companies unless they prescribe a disagreeable remedy."

The public service commission was requested by a resolution that in hearing arguments for increased rates by public utilities corporations the burden of proof be placed upon the corporations. The mayors took the attitude that thus far the cities have been obliged to take the burden of proving the fact that the increased rates were unnecessary. Another resolution requested the appointment of a legislative committee to meet with a committee of mayors to arrive at a uniform tax budget.

The officers of the present year were re-elected as follows: Mayor Walter R. Stone, of Syracuse, president; Mayor James T. Smith, of Utica, vice-president; William P. Capes, secretary; James R. Watt, Albany, treasurer; H. Clayton Midlam, of Rome, and Palmer Canfield, Jr., of Kingston, members of bureau council.

Dr. James Sullivan, state historian, addressing the convention of city clerks, advocated life tenure of office and adequate salaries for city clerks as the only means by which valuable records of the cities could be kept and made readily accessible. Dr. Sullivan spoke on "Public Records, Their Preservation." He said in part:

"To accomplish the kind of work for

which a city clerk is really put in office, also implies a good remuneration so that he will not be tempted to leave his job to take up another which is more satisfactory from the point of view of salary. With permanency of tenure and sufficiency of income taken care of, the city clerk would be likely to devote his energies to scientific and business-like supervision of the public records.

"In the cities of this state there is the greatest variety in the matter of the care of municipal records. In some places they have excellent equipment both from the point of view of fire proofing and classification. In others the records are so kept that if a fire were to take place nothing would be left of them, and they are so arranged that the greatest difficulty is encountered in consulting them. Between these two extremes there is a gradation from the very best to the very worst."

Dr. Matthias Nicoll, Jr., deputy state health commissioner, addressed the session of the city clerks' convention on "The Marriage Law and Public Health." He discussed the amendment to the domestic relations law which requires the clerk to secure an affidavit from contracting parties relative to venereal diseases and declared that it is slowly but surely fulfilling the purpose for which it was designed.

American Association of Engineers

The Board of Directors of the American Association of Engineers has named an organization committee to formulate a plan to carry out the instructions of the annual convention, contained in the resolution providing for the promoting of the non-technical interests of engineers in public service and to make a national study of proper pay for engineers. The committee consists of A. N. Johnson, consulting highway engineer, Portland Cement Association, Chicago; A. R.

Hirst, state highway engineer, Madison, Wis.; Samuel C. Haddon, editor Municipal and County Engineering, and Dr. F. H. Howell, president of the association.

The Salt Lake Club of the American Association of Engineers has been organized with R. B. Ketcham, Dean of the University of Utah, as chairman, and Eugene Bush, 273 Tenth ave., Salt Lake City, as temporary secretary. Petition for a chapter charter will be circulated so that the chapter can be installed by president Howell when he visits Salt Lake City this summer.

PERSONALS

Simonds, Fred W., formerly city engineer of Rahway, N. J., has been appointed city manager of Elizabeth, N. C.

Gilmer, D. E., of Hutchinson, Kans., has been appointed superintendent of construction, Federal-aid roads, Reno County.

Older, Fred, Adrian, Mich., has been appointed city engineer of Ypsilanti, Mich., succeeding W. R. Caldwell.

Munroe, Julius K., has been appointed state road commissioner of West Virginia, with headquarters at Charleston, succeeding T. S. Scanlon, resigned.

Hommon, Major H. B., Sanitary Corps, formerly in charge of the water

supplies in the Advance Section, A. E. F., recently returned. Major Hommon was on leave of absence from the U. S. Public Health Service, and will return to his former position early in July, with headquarters at Cincinnati, Ohio.

Strait, M. W., Zanesville, Ohio, has been appointed city engineer of Anderson, S. C.

Felps, C. T., of the 23d Engineers, A. E. F., has been appointed division engineer, State Highway Commission of Kansas.

Hungerford, A. B., who was recently appointed city engineer of Hudson, Kan., has been appointed city manager.

Cook, Charles C., has resigned as city engineer of Wheeling, W. Va. He had served for sixteen years.

MUNICIPAL INDEX

(Continued from page 27)

Failure of fares to correspond to other prices is one of most conspicuous examples of the injustice of the depreciated dollar. By Irving Fisher, professor of political economy, Yale University. 1,600 words. Electric Railway Journal, June 7. 15 cts.

Sewer Work Puts Extra Tax on Ways Department in Brooklyn. Tracks had to be removed and temporary routes provided to insure minimum interference with passenger traffic. 3 illus., 800 words. Electric Railway Journal, June 28. 15 cts.

Highway Transport Engineering:

Highway Transport Engineering—a New Technical Field. Breadth of training necessary for the transport engineer; many problems to be solved; suggested course of study. 1,000 words. Engineering News-Record, June 12. 20 cts.

Highway Transport Engineering. This branch of engineering deals with science, art, economics and business of highway transportation of passengers and commodities; subjects of which highway transport engineer should have knowledge. Presidential address at meeting of National Highway Traffic Ass'n, by A. H. Blanchard, consulting highway engr., N. Y. C. 1,500 words. Good Roads, June 21. 10 cts.

Highway Transport Engineering: A New Field for Engineers. Comprehensive courses offered by educational institutions should include economics, political economy, social science, business and contract law, scientific management, interstate commerce, marketing and distributing systems, etc. 1,000 words. Engineering and Contracting, June 4. 15 cts.

MISCELLANEOUS.

Some Engineering Problems of City Planning. Abstracts of papers before the National Conference on City Planning held at Niagara Falls and Buffalo last week; regional planning, industrial cities, steam railroad and city plan, common sense of civic centres. Papers by Thomas Adams, housing and town-planning adviser of the Canadian Government, Ottawa; John Nolen, city planner,

Cambridge, Mass.; E. J. Fort, city manager, Niagara Falls, N. Y.; N. P. Lewis, chief engr., Board of Estimates and Apportionment, N. Y. C. 3,000 words. Engineering News-Record, June 5. 20 cts.

Shade Trees in Streets. City authorities possess broad powers for removal of trees, if in their judgment such removal is of public benefit; conditions under which citizens can obtain injunction; court decisions. By John Simpson. 2,400 words. Municipal Journal and Public Works, June 14. 10 cts.

Preserving Shade Trees. Editorial comment on the slaughtering of trees and need for protection which should be contained in city charters. 300 words. Municipal Journal and Public Works, June 14. 10 cts.

Small Municipal Blacksmith Shop. Installed in stable yard of the street department in Waltham, Mass.; proved paying investment. 250 words. Municipal Journal and Public Works, June 14. 10 cts.

Advantages of the Cost-Plus-a-Fee Contract for Building Construction. The old gambling contract; war-time test proves merit of cost-plus contracts. By A. E. Wells, pres., Wells Bros. Construction Co., Chicago, Ill. 1,300 words. Municipal and County Engineering, June. 25 cts.

Unit Price Contracts Versus Percentage Contracts. Great result of unit price method is that during last 49 years unit prices have decreased in face of rising values of labor and materials. By W. L. Darling. 1,400 words. Engineering and Contracting, June 18. 15 cts.

The Engineer in Politics—by One Active Therein. W. A. Stinchcomb, recent candidate for mayor of Cleveland, explains why engineers are fitted for solving political problems. 1,200 words. Engineering News-Record, June 19. 20 cts. 1,500 words. Engineering World, June 15. 15 cts. 1,500 words. Municipal and County Engineering, June. 25 cts.

Presidential Address at Convention of Civil Engineers. Fayette S. Curtis outlines the duties of the engineer and reviews past accomplishments; promises for future. 3,000 words. Engineering News-Record, June 19. 20 cts.

How the American Association of Engineers Aided Engineers in St. Louis

Municipal Service in Effort to Improve Their Condition. Table of present and proposed salary scales. By an engineer in public service in St. Louis. 1,800 words. Municipal and County Engineering, June. 25 cts.

Three City Engineers Discuss the Movement Calculated to Improve the Employment Conditions of All Engineers in Public Service. Letters to the editor from H. C. McClure, commissioner of engr. and constr., Dayton, O.; E. A. Ziesloft, city civil engr., Akron, O., and E. A. Fisher, city engr., Lakewood, O. 1,800 words. Municipal and County Engineering, June. 25 cts.

Progress by Engineering Council's Compensation Committee. Seriousness of situation considered and principles for classification and salary schedule are proposed. 1,500 words. Engineering News-Record, June 19. 20 cts.

Will Common Labor Wages Rise? Effect of lack and restriction of immigration and the labor unions on wage rates of unskilled workmen; need for labor-saving machinery and methods; editorial. 800 words. Engineering and Contracting, June 4. 15 cts.

Function of Corporate Contract Bonds—How Obtained. Great care must be exercised by surety companies in issuing them; questions asked by bonding companies; many rejections. By H. V. Swart, specialist in contract bonds, N. Y. C. 2,200 words. Engineering News-Record, June 19. 20 cts.

Red Coats for Rodmen. Problem of finding rodmen through telescope during large survey in North Carolina. By W. A. Hardenbergh. 400 words. Municipal Journal and Public Works, June 14. 10 cts.

Advantages of Combined Operation of Water and Electric Utilities and Selling Electric Current for Private Use in Springfield, Ill. By W. J. Spaulding, commissioner of Public Property, Springfield. 1,800 words. Municipal and County Engineering, June. 25 cts.

Balanced Automatic Sluice Gate for Park Dam. In central spillway of concrete dam movable timber section drops when flood height tops main crest. 4 illus., 200 words. Engineering News-Record, June 12. 20 cts.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STREETS AND ROADS.

CONTRACTS AWARDED ITEMIZED PRICES

Ala., Montgomery. 11 a.m., July 20.
Paving 15,000 sq. yd. with brick, asphalt, bitulithic, mineral rubber, wood block, concrete or asphaltic concrete.—S. E. Washburn, City Engr.

Ark., Bentonville. July 16.
Improving road involving excavation, graveling, culverts, etc., in Benton Co.—Co. Judge.

Ark., Little Rock. 10 a.m., July 19.
Road in Pope Co., involving 40 acres clearing and grubbing, 110,000 cu. yd. grading, 51,000 cu. yd. large stone, 11,500 cu. yd. small stone, 62,500 cu. yd. spreading and rolling, 232,000 cu. yd. asphaltic surfacing, 750 cu. yd. reinforced concrete in bridges and culverts, four steel bridges, 1,920 lin. ft. 12 to 35-in. clay culvert pipe, etc.—Parker Engrg. Co., Pine Bluff.

Ark., Marion. 11 a.m., July 24.
Eleven mi. earth road embankment, involving 200,000 cu. yd. earth embankment.—Morgan Engrg. Co., Memphis.

Fla., Seabreeze. 8 p.m., July 24.
42,000 sq. yd. hard surface pavement, 10,500 lin. ft. 12 to 27-in. drain pipe, 120 catch basins, 25 manholes, 34,000 lin. ft. 4x10 concrete curb, 7,000 cu. yd. excavation.—C. M. Rogers, Engr., Daytona.

Fla., Kissimmee. 8.30 p.m., July 14.
Draining, grading, curbing and paving streets with vitrified brick, concrete, bituminous concrete, asphalt block, patented or other pavement, involving 15,555 sq. yd. paving, 17,000 lin. ft. 4x10-in. concrete curbing, 2,300 cu. yd. grading, etc.—A. J. MacDonald, City Engr.

Fla., Quincy. 4 p.m., Aug. 8.
27,100 sq. yd. paving.—J. B. McCrary Co., Engrs., Atlanta.

Ga., Rome. 2 p.m., July 22.
Seven mi. road through Floyd Co., including drains, culverts, etc., involving 15,687.5 cu. yd. earth excavation, 13,124.8 cu. yd. borrow excavation, 20,080.3 cu. yd. top soil surfacing, 472.5 lin. ft. 12 to 24-in. D. S. citr. clay pipe, etc.—J. B. McCrary Co., Engrs., Third Natl. Bank Bldg., Atlanta.

Ill., Chadwick. 2 p.m., July 19.
4.9 mi. 12-ft. gravel or macadam road in town of Fair Haven.—J. F. Plumer, Town Clk., Town Hall.

Ill., Mattoon. 2 p.m., July 14.
Paving in Coles Co.—F. E. Bishop, Supt. Hwys.

Ill., La Grange. 7.30 p.m., July 14.
35,000 sq. yd. asphaltic concrete paving on old macadam foundation, with concrete curb and gutter, new catch-basins and catch-basin inlets.—E. Hancock, Vil. Engr., 2047 Ogden Ave., Chicago.

Ind., Indianapolis. July 15.
Improving 46.34 mi. state roads with plain concr., monolithic brick or bituminous concr.—State Hwy. Comm.

Ind., Indianapolis. 10 a.m., July 22.
Gravel road on line between Pike and Washington Twps.—L. K. Fesler, Co. Aud.

Ind., Shelbyville. 10 a.m., July 23.
10,600 ft. gravel road on line between Shelby and Hancock Cos.—F. W. Fagel, Co. Aud.

Ind., Indianapolis. 10 a.m., July 16.
14,873 ft. reinforced concrete road in Washington Twp. and 3,600 reinforced concrete road in Center and Washington Twps.—L. K. Fesler, Co. Aud.

Ind., Columbia City. 2 p.m., July 19.
Three gravel roads in Columbia and Union Twps. and a slag base and gravel road in Union Twp.—W. K. Burwell, Co. Aud.

Ind., Huntington. 2 p.m., Aug. 5.
Co. line road between Whitley and Huntington counties.—O. E. Eviston, Co. Aud.

Ind., Indianapolis. July 16.
Grading, paving with bituminous concrete, and culverts on 7,990 ft. road; 14,873 ft. 50-ft. concrete road; 3,600 ft. 50-ft. road.—J. J. Griffith, Engr.

Ind., Indianapolis. July 18.
Grading and paving with concrete 8,724 ft. 20-ft. road; also 26,218 ft. reinforced concrete 20-ft. road.—J. J. Griffith, Engr.

Ia., Adair. 3.30 p.m., July 16.
20,678 sq. yd. street paving, 513 sq. yd. alley paving and 15,542 lin. ft. curb and gutter.—T. S. DeLay, Cons. Engr., Creston.

Ia., Jefferson. July 16.
64,500 sq. yd. paving and 28,500 lin. ft. curbing.—E. F. Raver, City Clk.

Kan., Leavenworth. 9 a.m., July 15.
Paving street with 2-in. asphaltic concrete on present brick pavement as base.—W. V. Thomas, Engr.

Mass., Boston. noon, July 14.
Wood block pavement in city street.—T. F. Sullivan, Comr. Pub. Wks., 508 City Hall Annex.

Mass., Boston. noon, July 16.
Repairing bituminous pavement on any city street not under guarantee, between July 21, 1919, and Jan. 31, 1920.—T. F. Sullivan, Comr. Pub. Wks., 508 City Hall Annex.

Mass., Boston. noon, July 17.
Grading, loaming, drainage and concrete work on square in Charlestown.—J. B. Shea, Chmn., Park and Recreation Dept., 33 Beacon St.

Mass., Boston. noon, July 15.
2,400 ft. concrete asphalt road in Northbridge.—F. I. Bieler, Secy., State Hwy. Comm., State House.

Mich., Charlotte. July 12.
Grading street.—C. R. Youngs, City Clk.

Mich., Lansing. 1.30 p.m., July 15.
Improving 6 mi. trunk line road between Lansing and Grand Ledge in Delta Twp., Eaton Co., involving grading and constructing necessary drainage structures.—F. F. Rogers, State Hwy. Comr.

Minn., Rochester. 2 p.m., July 15.
State road, involving 78,702 cu. yd. earth excav.; 6,898 cu. yd. sand rock excav.; 2,200 lin. ft. guard rail; 698 ft. 15 to 42-in. portable culverts, box culverts, etc.—L. J. Fiegel, Co. Aud.

Minn., Faribault. 2 p.m., July 16.
13 fed. rd. proj. No. 64, involving 107,148 cu. yd. excav.; 1,392 lin. ft. 15 to 24-in. portable culverts, 205 cu. yd. concr. for standard culverts, and 136,082 sq. yd. concr., asphalt concr., or brick pavement.—F. M. Kaisersatt, Co. Aud.

Minn., Red Wing. 1.30 p.m., July 17.
Graveling 21.25 mi. road; also rein. concr. span bridge.—C. H. Meyer, Co. Aud.

Minn., Brainerd. 3 p.m., July 19.
21 mi. fed. aid proj. No. 51, involving 100 acres clearing and grubbing, 140,000 cu. yd. grading, 20,000 cu. yd. overhaul, 7,000 lin. ft. guard rail, 500 lin. ft. tile drain, 2,275 lin. ft. 12 to 24-in. portable culverts, 101,600 lin. ft. shaping and compacting, 5 concr. box culverts, 3 rein. concr. bridges, etc.—C. W. Mahlum, Co. Aud.

Minn., Duluth. 11 a.m., July 22.
Paving street.—J. A. Farrell, Comr. Pub. Wks.

Miss., Monticello. noon, July 15.
Eleven mi. road between Jackson and Gulfport, involving 69,000 cu. yd. grading, six acres clearing and grubbing, 11 mi. sodding, 700 lin. ft. culvert pipe, etc.—State Hwy. Dept., Jackson.

Miss., New Albany. noon, July 18.
Twenty-four mi. road between Tupelo and Memphis, involving 48,000 cu. yd. gravel.—State Hwy. Dept., Jackson.

Miss., Winona. noon, July 17.
9.3 mi. road between Jackson and Memphis, involving 16,900 cu. yd. gravel.—State Hwy. Dept., Jackson.

Mo., Bethany. 3 p.m., July 23.
Grading, paving with concrete, laying macadam shoulders, concrete and vitrified pipe culverts, etc., on 9.4 mi. state road.—M. G. Hall, Engr., Centerville, Ia.

Mo., St. Louis. noon, July 25.
Paving 1,038 ft. roadway with bitulithic, 30 ft. wide, and constructing curb.—W. W. Horner, City Engr.

Mo., St. Louis. noon, July 15.
Reconstructing street with treated wood block pavement and granite curb; improving three streets with bitulithic pavement and granite or concrete curb.—E. R. Kinsey, Pres., Bd. Pub. Serv.

N. J., Trenton. 10.30 a.m., July 14.
Repairing 14,000 ft. road in Woodbridge Twp. with bituminous dressing.—A. L. Grover, Chief Clk., State Hwy. Comm.

N. J., Elizabeth. 2.30 p.m., July 27.
Two roadway intersections of macadam or amiesite in Summit; 5,500 ft. bituminous concrete roadway on old and new macadam base in New Providence.—J. L. Bauer, Co. Engr., 120 Broad St.

N. Y., Albany. 1 p.m., July 22.
Improving highways, involving 25.24 mi. in Cattaraugus, Chautauqua, Chenango, Lewis, Onondaga, Rensselaer and Suffolk counties; also completing 84.01 mi. highways in Cayuga, Chautauqua, Chenango, Franklin, Niagara, Oswego, Saratoga and Seneca counties; also repairing three roads in Allegany, Schuyler and Steuben counties, Oswego and Suffolk counties; and completing road repair in Chenango and Cortland counties.—F. S. Greene, Comr. of Hwys.

N. Y., New Rochelle. 11 a.m., July 11.
Repaving two streets with bitulithic or pavement equal thereto.—S. J. Garges, Comr. Pub. Wks., City Hall.

N. Y., St. George, S. I. noon, July 14.
3,450 cu. yd. 1½-in. broken stone, 290 cu. yd. ¾-in. broken stone, 1,440 cu. yd. screenings, 100 cu. yd. broken stone chips or trap rock, and 580 cu. yd. grits.—C. D. Van Name, Pres., Boro. of Richmond.

N. Y., Albany. 1 p.m., July 29.
Improving 11.42 mi. highways in Chautauqua and Jefferson counties; completing 114.65 mi. highways in Allegany, Cattaraugus, Cayuga, Dutchess, Franklin, Jefferson, Monroe, Oneida, Onondaga, Orange, Schuyler and Wayne counties.—F. S. Greene, Comr. Hwys.

N. Y., Hudson Falls. 2 p.m., July 15.
Concrete pavements in various streets and repairing macadam pavement.—Elizabeth M. Hurley, Vil. Clk.

N. Y., Long Island City. 11 a.m., July 14.
Paving with sheet asphalt on concrete foundation, grading, curbing and laying sidewalks and gutters, paving with asphalt block on 6-in. concrete foundation, etc., on city streets.—M. E. Connolly, Boro. of Queens.

BIDS ASKED FOR

N. Y., St. George, S. I. noon, July 15.
Repairing with bituminous concrete pavement, involving 10,600 sq. yd. pavement, etc.—C. D. Van Name, Pres., Boro. of Richmond.

N. Y., Brooklyn. 11 a.m., July 16.
Grading, curbing and laying sidewalks, paving with permanent asphalt on 6-in. concrete foundation, restoring pavements within railroad area, repaving with special granite pavement on present concrete foundation, on city streets.—E. Riegelmann, Pres., Boro. of Brooklyn.

N. Y., New York. 2 p.m., July 14.
Repaving with granite block and sheet asphalt on concrete foundation.—F. L. Dowling, Pres., Boro. of Manhattan.

O., Cleveland. July 16.
Grading, draining, curbing, paving, repaving and improving avenue.—Comr. Purch. and Supply, 219 City Hall.

O., Ashland. July 16.
Grading, curbing and paving with brick, asphalt or other suitable pavement.—City Engr.

O., Green Springs. 10 a.m., July 15.
Grading and paving street.—L. A. Boulay, Engr., Court House, Toledo.

O., Troy. July 21.
One mi. gravel or crushed stone road.—Co. Engr.

O., Kent. noon, July 25.
Grading, draining, curbing and paving 8,500 sq. yd.—R. C. Harvey, Engr.

O., Amherst. July 20.
Grading, paving and curbing various streets, involving 1,700 lin. ft. 4-in. brick paving, etc.—Warden & Laundon, Engrs., 400 Elyria Bldg.

O., Springfield. July 16.
4,653 ft. wood or granite block pavement and sheet asphalt, bitulithic or brick pavement, involving 11,400 sq. yd. paving and 9,100 ft. concrete curb.—O. E. Carr, City Engr.

Pa., Union City. 10 a.m., July 15.
Reconstructing 9,154 ft. reinforced concrete and hillside vitrified brick pavement in Union Twp., Erie Co.—McClintock & McClintock, Sprout & Morrow Bldg., Main St.

Pa., Philadelphia. July 15.
Grading four streets, paving two streets with asphalt, resurfacing and repaving asphalt streets, constructing footways and terra cotta drain.—F. C. Dunlap, Chief, Bureau of Hwys., Dept. Pub. Wks.

Pa., Pittsburgh. July 17.
2,800 ft. 24-in. vitrified brick and asphaltic concrete road in Lebanon Twp., and 15,350 ft. 16-in. reinforced concrete road in Richland and McCandless Twp.—R. V. Warren, Engr., Court House.

Pa., Harrisburg. 10 a.m., July 29.
Reconstructing 468,834 ft. roads with one or two-course reinforced concrete, hillside vitrified brick, bituminous surface course on concrete foundation and on telford foundation, and bituminous mixtures on prepared broken stone base, in Adams, Beaver, Bradford, Bucks, Chester, Delaware, Crawford, Erie, Fayette, Jefferson, Lawrence, Mifflin, Montgomery, Northampton, Susquehanna, Washington and Westmoreland counties.—L. S. Sadler, State Hwy. Comr.

Pa., Hollidaysburg. 7 p.m., July 14.
Paving street with brick on 5-in. conc. base or 2-course rein. Conc., involving 5,300 sq. yd. paving, 2,500 cu. yd. excav., and 3,200 lin. ft. concr. curb.—J. L. Henry, Boro. Engr.

Pa., Ebensburg. 10 a.m., July 14.
Reconstructing 10½ mi. hwy. in Croyle Twp., with 16-ft. roadway of vitr. brick paving block on combination concr. base and curb.—O. P. Thomas, Engr., Leader Bldg., Johnstown.

Pa., Shenandoah. July 14.
Paving 9,500 sq. yd. with wood block, vitr. brick, sheet asphalt, tarvia or other suitable paving material; also 3,177 sq. yd. asphalt covering on old Belgian block.—D. T. Glover, Boro. Engr.

Pa., Pottstown. July 15.
28,715 sq. yd. vitr. brick paving on concr. foundation.—M. L. Seasholtz, Boro. Clerk.

R. I., Providence. noon, July 16.
3,930 ft. bituminous concrete pavement in Cranston; 14,250 ft. bituminous macadam roads in Warwick, and 5,280 ft. bituminous macadam road in Smithfield.—State Bd. Pub. Rds., State House.

Utah, Ogden. 10 a.m., July 22.
Sidewalks.—W. J. Critchlow, City Rec.

Va., Roanoke. noon, July 18.
Granolithic sidewalks, curb and gutter, concrete paving and 8-in. sewer.—City Engr.

Vt., Montpelier. noon, July 15.
9.6 mi. gravel roads in towns of Irasburg, Williston, Sherburne and Marlboro; also 2.4 mi. bituminous macadam in town of Fairlee.—H. M. McIntosh, State Engr.

Wash., Tukwila. 8 a.m., July 17.
Improving streets, involving 10,000 cu. yd. earthwork and 5,000 ft. concrete sidewalks.—F. J. Klein, Supt. Sts.

Wash., Tukwila. 8 p.m., July 18.
Grading roadway and constructing sidewalks in several streets.—F. J. Klein, Supt. Streets.

W. Va., Huntington. July 15.
Grading, draining, concrete curbing, brick paving, etc., on one mi. road in Cabell Co.—Co. Court.

Ont., Ottawa. noon, July 18.
Two highways.—Deputy Minister, Dept. of the Interior.

SEWERAGE.

Conn., West Haven. 8 p.m., July 14.
Reconstructing portion of main outfall sewer, comprising 900 ft. 24-in. wood stave pipe and manholes.—Clyde Potts, 30 Church St., N. Y. City.

Ind., Indianapolis. 10 a.m., July 15.
Furnishing glazed sewer pipe for free gravel roads.—L. K. Fesler, Co. Aud.

Kan., Wamego. 8 a.m., July 29.
12,500 lin. ft. sanitary sewer, with necessary manholes and flushing tanks.—Doyle, City Clk.

Mass., Boston. noon, July 14.
Sewerage works in street in West Roxbury.—T. F. Sullivan, Comr. Pub. Wks., 508 City Hall Annex.

Minn., Milaca. July 16.
Sewer and water mains, involving 2,972 lin. ft. 15-18-in. sewer pipe and 1,572 lin. ft. 4-6-in. cast-iron water mains.—J. B. Gray, Engr.

Mont., Butte. 8 p.m., July 16.
Storm sewer.—S. Irvine, City Clk.

Mo., Kansas City. 2 p.m., Aug. 19.
Constructing Turkey Creek sewer, two sewage pumping stations, laterals and extensions of existing sewers, consisting of 1.2 mi. main sewer of reinforced concrete and 3½ mi. laterals and extensions of concrete, segment blocks or clay pipe.—A. D. Ludlow, Engr. of Sewers, City Hall.

Mo., Kansas City. 2 p.m., Aug. 14.
Turkey Creek sewer, involving 5 mi. sewer.—A. D. Ludlow, Engr., City Hall.

Miss., Laurel. July 15.
4,500 ft. 6-in. sewers.—G. Montgomery, Mayor.

Neb., Deshler. July 25.
Sewers.—W. E. Standeven, Engr., 414 Peters Trust Bldg., Omaha.

Neb., Newman Grove. July 15.
Sanitary sewers in various streets, involving 16,420 ft. 8-in. and 5,560 ft. 10 to 15-in. vitrified pipe.—W. E. Standeven, 141 Bee Bldg., Omaha, Engr.

O., Youngstown. July 16.
Sewering avenue.—C. F. Ohl, Clk., Bd. Pub. Serv.

O., Akron. July 16.
Sewer in Manchester Rd.—E. A. Zeisloft, Chief Engr.

O., Jamestown. noon, July 12.
Sewage disposal plant in Ross Twp.—Werner & Adkins, Archts., Mitchell Bldg., Cincinnati.

O., Warren. July 15.
Sanitary sewer, mostly of 8-in. vitrified sewer pipe.—City Engr.

S. D., Aberdeen. 9 a.m., July 28.
Storm sewer, involving 8 mi. vitrified, segmental block or concrete pipe from 10 to 96 in. in diameter, with 100 manholes and 212 catch basins.—F. W. Raymond, City Aud.

Va., Roanoke. noon, July 18.
8-in. sewer.—W. P. Hunter, City Engr.

Wis., Lake Geneva. 4 p.m., July 15.
Three-compartment sewage disposal tank and sludge bed.—F. A. Briegel, City Clk.

WATER SUPPLY.

Ia., Decorah. 7:30 p.m., July 16.
11,400 lin. ft. 4-in. water main, necessary connections to valves, T's, L's and fire hydrants, relaying 600 ft. 10-in. vitr. sewer pipe.—M. D. Wells, City Clk.

Ia., Lincoln. 2 p.m., July 12.
Water system.—G. W. Rowland & Co., Engrs., Des Moines.

Ia., Wapello. 1 p.m., July 15.
Steam driven pumping plant containing one 36-in. and one 24-in. double suction centrifugal pump.—Elliott & Harmon Engrg. Co., Peoria, Ill.

Minn., Litchfield. Aug. 1.
Addition to water works system and sewers.—L. P. Wolff, 1001 Guardian Life Bldg., St. Paul.

O., Akron. noon, July 18.
Furnishing 1,500 water meters; 140 gate valves, from 4 to 12-in.; cutting-in sleeves and valves from 6x6-in. to 25x16-in.; 40 fire hydrants, from 6 to 10-in.—G. G. Dixon, Engr., 102 E. Mill St.

O., Akron. noon, July 25.
Elevated water tank, 150,000-gal. capacity with 70-ft. tower (monolithic tower and tank of reinforced concrete, or steel tower and tank enclosed in reinforced concrete shell).—Bureau of Water Works Improvement, 102 E. Mill St.

O., Cleveland. July 18.
Installing water mains in various streets and furnishing brass fittings for Division of Water; also by-pass high pressure piping at pumping station.—Comr. Purch. and Supply, 219 City Hall.

Wis., Milwaukee. 10:30 a.m., July 18.
Laying water service connections and house drains wherever necessary.—P. Braman, Deputy Comr. Pub. Wks.

Wis., Milwaukee. 10:30 a.m., July 16.
One 20,000,000 gal. pumping engine.—Wm. R. Callahan, Purch. Agt., Central Bd. of Purchases.

Ont., Toronto. noon, July 19.
8,024 ft. 6-in. cast iron water mains on two roads in Twp. of York.—F. Barber, Engr., 40 Jarvis St.

LIGHTING AND POWER.

Kan., Osawatimie. 8 p.m., July 28.
Lighting system.—Black & Veatch, Engrs., 507 Inter-State Bldg., Kansas City, Mo.

N. Y., Brooklyn. 3 p.m., July 23.
Additional power house equipment for state hospital here.—L. F. Pilcher, State Archt., Capitol, Albany.

O., Martins Ferry. July 17.
From 70 to 110 lights, ranging from 250 to 600 candle power, for lighting streets and municipal buildings in village of Bridgeport.—C. A. Schnell, Vil. Clk.

Wash., Olympia. 11 a.m., July 15.
Installing one 350-h.p. water tube boiler in power house of state school at Medical Lake.—Bd. Control.

Ecuador. Sept. 1.
Electric light and power plant.—File No. 119,670, Bureau of Foreign and Domestic Commerce, Washington, D. C.

FIRE EQUIPMENT.

D. C., Washington. July 15.
Furnishing heavy brass play pipe and fittings and 5,000 ft. rubber fire hose.—Bureau of Supplies and Accounts, Navy Dept.

Mass., Boston. noon, July 15.
Furnishing 1½ to 2-ton motor truck for fire department.—J. R. Murphy, Fire Comr., Bristol St.

O., Xenia. July 24.
Furnishing new fire apparatus.—City Clk.

BRIDGES.

Ark., Little Rock. 2 p.m., Aug. 4. Foundations, piers, superstructure and approaches, etc., of 2 reinforced concrete bridges across Arkansas River, 1,450 ft. and 1,091 ft. in length, involving 55,000 cu. yd. reinforced concrete.—Hedrick & Hedrick, Bridge Engrs.

Fla., Jacksonville. July 29. 2,100-ft. bridge over St. Johns River.—F. Brown, Duval, Co. Clk.

Fla., Jacksonville. July 22. Bridge across St. Johns River.—County Comrs.

Ga., Swainsboro. Aug. 20. Reinforced concrete bridge over Big Ochopee River.—J. B. McCrary Co., Engrs., Third Natl. Bank Bldg., Atlanta.

Ga., Rome. noon, July 22. Concrete bridge across Cabin Creek in Floyd Co.—J. R. Cantrell, Chmn., Bd. of Comrs. of Roads and Revenues.

Ind., Hartford City. 2 p.m., July 21. Two bridges in intersection line between Blackford and Jay counties.—W. C. Hughes, Co. Aud.

Ind., Shoals. noon, July 17. Completing bridge by grading, draining and paving road in Holbert Twp.—Lorenzo D. Haga, Co. Aud.

La., Cedar Rapids. 10 a.m., July 15. 6-span concrete steel arch highway bridge over Cedar River and removal of present structure.—Marsh Engrg. Co., Engrs., Des Moines.

Masn., Boston. noon, July 15. Repairing bridge over Fort Point channel.—T. F. Sullivan, Comr. Pub. Wks., 503 City Hall Annex.

Minn., Faribault. July 16. Widening roadway of bridge in Rice Co.—F. M. Kaisersatt, Co. Aud.

Minn., Walker. 10 a.m., July 22. Bridge on State road in Cass Co.—C. D. Bacon, Co. Aud.

Neb., Grand Island. July 15. 800-ft. bridge 16 ft. wide, 16 50-ft. rein. concr. arch spans and 3,000 lin. ft. approach fill.—G. E. Johnson, State Hwy. Dept., Lincoln.

N. J., Rahway. 2:30 p.m., July 27. Concrete and steel beam, 3-span bridge over Rahway River.—J. L. Bauer, Co. Engr., 120 Broad St., Elizabeth.

N. Y., Elmira. 11 a.m., July 14. Concr. bridge, 830 ft. long and 30 ft. high, with 8 arches, over the Chemung River.—City Engr., City Hall.

N. D., Linton. July 18. Bridges in Emmons Co.—E. H. Brant, Co. Aud.

O., Canton. July 14. Reinforced concrete bridge, 75 ft. long, three spans, 36-ft. brick roadway and 10-ft. sidewalks.—N. S. Schick, Co. Clk.

O., Lancaster. July 17. Abutments to bridge in Liberty Twp.—Co. Engr.

O., Lebanon. July 28. Replacing abutment to bridge over Twin Creek, Warren Co.—M. E. Ross, Co. Aud.

O., Bowling Green. July 28. Reinforced concrete bridge in Washington Twp. and one in Milton Twp.—R. S. Gillespie, Co. Aud.

O., St. Clairsville. July 21. Nine reinforced concrete bridges.—B. W. Hopkins, Co. Aud.

O., Columbus. July 16. Bridge over Hayden Run in Norwich Twp., Franklin Co.—Co. Engr.

O., Bellaire. July 21. Nine reinforced concrete bridges.—B. W. Hopkins, Co. Aud.

O., Columbus. July 16. Superstructure of bridge, including removal of old superstructure, paving, etc.—W. J. Herman, Clk. Bd. Comrs.

Pa., Ridgeway. July 14. Rebuilding bridge in Ridgeway Twp.—A. H. Shaffer, Engr.

Pa., Du Bois. noon, July 14. Bridge on city street.—G. A. Flink, Engr., Harrisburg.

Pa., Philadelphia. July 15. Constructing two bridges and painting bridge.—F. C. Dunlap, Chief, Bureau of Hwys., Dept. Pub. Wks.

Va., Spotsylvania. noon, July 11. Reinforced concrete bridges in Spotsylvania Co.—G. P. Coleman, State Hwy. Comr., Richmond.

Dominican Republic, Santo Domingo. 10 a.m., Sept. 30. Rein. Concr. bridge and approaches over the Rio Yaque del Sur in the Province of Azua, consisting of 2 rein. concr. arches 11 ft. span each, and 4 slab spans 22 ft. each, 304 ft. long and 18 ft. 9 in. wide.—Dir. Gen. Pub. Wks.

Ont., Toronto. noon, July 21. Concrete bridge or steel bridge with concrete substructure.—W. A. McLean, Deputy Minister of Hwys.

MISCELLANEOUS.

Cal., San Francisco. 2 p.m., July 30. Constructing Hetch Hetchy dam and appurtenant works in Tuolumne Co., involving 77,000 cu. yd. excav. below stream level; 60,500 cu. yd. excav. above stream level; 298,800 cu. yd. cyclopean masonry, and 66,850 cu. yd. concr.—M. M. O'Shaughnessy, City Engr.

Cal., Los Angeles. 11 a.m., July 18. Silt diversion works near Los Angeles and Long Beach harbors.—U. S. Engr. Office, 725 Central Bld.

Col., Las Animas. noon, July 17. Dam, involving 620,000 cu. yd. fill and 50,000 cu. yd. earth work and 1,330 cu. yd. concrete.—Whiting & Laird, Engrs., Exchange Bldg., Denver.

Fla., Ft. Pierce. 2 p.m., July 30. Inlet cut and riprapping (inside work), and outside channel and jetties (outside work), involving 85,000 cu. yd. earth excav.; 1,720 cu. yd. jetty hearting, 2,200 tons jetty capping and 1,200 cu. yd. riprap.—M. Hallows, Chief Engr., Ft. Pierce Inlet Dist.

Fla., Jacksonville. noon, July 24. Jetty at entrance to St. Johns River.—U. S. Engrg. Office.

Ill., Chicago. 10 a.m., July 29. Concrete caisson breakwater and lighthouse crib at Indiana Harbor, Ind.—U. S. Engr. Office, 508 Federal Bldg.

Ill., Chicago. 10 a.m., July 29. Concrete caisson breakwater and lighthouse crib at Indiana Harbor, Ind.—U. S. Engr. Office, 508 Federal Bldg.

Ia., Marshalltown. 2 p.m., July 15. Straightening, widening, deepening and changing channel of the Iowa River, 1,400,000 yards.—F. B. Ingersoll, Engr. in Charge.

Ga., Savannah. noon, July 21. Dredging in Savannah harbor.—U. S. Engrg. Office, P. O. Bldg.

Md., Baltimore. 1 p.m., July 21. Dredging in channel to Curtis Bay.—U. S. Engrg. Office.

Mich., Sault Ste. Marie. 4 p.m., July 22. Dredging Grosse Pointe Channel, Lake St. Clair.—U. S. Engr. Office.

N. Y., Albany. noon, July 15. Barge canal terminal at Flushing, N. Y. City; furnishing industrial freight-handling trailers and stevedore freight-handling trucks for barge canal terminals.—E. S. Walsh, Supt. Pub. Wks., Albany, N. Y.

N. Y., New York. noon, July 21. Dredging in Passaic River, N. J.—U. S. Engr. Office, 39 Whitehall St.

O., Cincinnati. 2 p.m., Aug. 1. Lock and abutment for dam in Ohio River, near Chilo.—U. S. Engr. Office, First Dist.

O., Cincinnati. 2 p.m., July 28. Furnishing stone at dam in Ohio River.—U. S. Engr. Office, 405 Custom House.

Pa., Philadelphia. noon, July 25. Dredging in Schuylkill River.—U. S. Engrg. Office.

Hawaii, Honolulu. 11 a.m., Aug. 26. Dredging in Honolulu harbor.—U. S. Engrg. Office, 401 Custom House, San Francisco.

STREETS AND ROADS

Ala., Mobile.—Comrs. Mobile Co. voted to issue \$1,000,000 bonds to improve roads. Federal Govt. may appropriate like amount.

Ariz., Phoenix.—Federal aid in amount of approximately \$200,000 is to be requested by State Engr. Maddock toward construction of new Superior-Miami highway, for the building of which Legislature appropriated \$100,000. The new road, it is stated, will materially reduce the time between Phoenix and the Globe-Miami district and will serve as a shortcut to the route by way of the Roosevelt dam, known as the Apache trail.

Cal. (P. O. Alturas).—An election is proposed to vote on issuing road bonds to amount of \$400,000.

Cal., National City.—An election is proposed to vote street improvement bonds to amount of \$125,000.

Cal., Placerville.—Citizens of newly organized Marshal Blvd. Dist., at election, authorized bond issue of \$150,000 for permanent roads in the district. The improvements will include 60 mi. of roads in Supervisor Dists. 4 and 5, on the route between Auburn, Placer Co. and Placerville, El Dorado Co., via Coloma.

Del., Wilmington.—Estimates have been made up for paving 124 city blocks, for

which City Council made appropriation of \$750,000 some time ago, to be used as work went on. These streets will be paved as result of petitions of abutting owners. A beginning will be made at once, and whole work will take nearly a year for completion.

Ga., Albany.—Dougherty Co. will spend \$400,000 for road improvements and a memorial bridge over Flint River at Albany.

Fla., Ft. Myers.—City election in August to vote on \$50,000 bonds to pave various streets.

Ga., Folkston.—Charlton Co. receives bids in about 60 days building 20 mi. Dixie Hwy. Estimated cost, \$300,000. J. B. McCrary Co., Third Natl. Bank Bldg., Atlanta, Engrs.

Ga., Macon.—The issue of bonds amounting to \$5,605,000 are to be submitted to voters of thirteen counties for improving of roads.

Ga., Waycross.—City will vote on following bonds June 27: \$630,000 road, \$70,000 school.

Ida., Boise.—Residents of Five-Mile, Hillsdale and Meridian precincts petitioned Board of Ada Co. Comrs. for immediate calling of \$1,000,000 bond election to provide funds for building of roads.

Ida., Boise.—The Federal Government will spend \$131,000 on 30 mi. of Idaho-Pacific Hwy. in Glens Ferry Highway Dist.

Ida., Boise.—Building of waterlevel road to Arrow rock, a new Fairview Ave. bridge, bitulithic pavements from Boise to Canyon county line on the north and

south side of Boise River, and construction of two good roads, one on each side of Boise River, to Barberton, as well as thorough sanding of all principal county roads, are advocated by Ada Co. Comrs., who have been making survey of road problems which confront the county.

Ida., Moscow.—Three more highway districts in Latah Co. have voted \$420,000 bonds for road building. Elections were held in Troy, Deary and Bovill Hwy. Dists. This makes total of \$1,125,000 voted for highway bonds in Yath Co. Deary voted \$120,000 bonds. Bovill voted issue of \$175,000 bonds. Troy district voted \$125,000.

Ida., Sandpoint.—City plans to pave various streets, involving 285,000 sq. ft. concrete. About \$60,000.

Ill., Ashton.—Paving of 20 blocks contemplated. Address City Clk.

Ill., East St. Louis.—Chamber of Commerce plans to build 5 mi. concrete road from here to Madison, 100 ft. wide. J. N. Fining, Secy.

Ind., Delphi.—Contract for grading, draining, graveling, macadamizing, etc., on road in Madison Twp. awarded by Co. Comrs. of Carroll Co., to Chas. T. Minix, Flora.

Ind., Evansville.—In addition to selecting the Dixie Bee Line and the Evansville-Mt. Vernon Rd. as state market highways, the Indiana State Hwy. Comn. also selected the following roads for early improvement: French Lick Trail, from Evansville to Paoli; Midland Trail, from Vincennes east through Washington and Shoals to West Baden; Hoosier

Hwy., from Princeton east to Jasper; highway from Muren to Petersburg; highway from Cannelton north to Boonville; highway from Rockport to proposed east and west state highway.

Ind., Indianapolis—Estimates for construction of highways for which State Hwy. Comm. proposes to receive bids are on file in Comm. offices. The estimates are as follows, the figures given being in each case for one mile of road: Niles Rd., north from South Bend, 4.68 mi.; concrete, \$34,815.70 a mi.; for brick, \$45,711.35; for bituminous concrete, \$41,102.40. Madison Rd., Indianapolis to Greenwood, 7.3 mi.; concrete, \$28,594.80; brick, \$42,602.35; bituminous, \$38,812.30. National Rd. Gap, between Cambridge City and Centerville, 1.5 mi.; concrete, \$25,100; brick, \$40,595.73; bituminous, \$41,611.56. National Rd., west and east of Putnam-Hendricks county line, 8.12 mi.; concrete, \$31,224; brick, \$45,121; bituminous, \$41,577.60. National Rd., from Indianapolis to Hendricks county line, 6.11 mi.; concrete, \$29,319.45; brick, \$43,362.20; bituminous, \$39,536.85. Range Line Rd., from 1½ mi. north of Broad Ripple to Carmel, 5.76 mi.; concrete, \$29,790.20; brick, \$43,975; bituminous, \$40,142.10. Lincoln Hwy., from Osceola to Elkhart, 3.5 mi.; concrete, \$28,074.70; brick, \$41,988; bituminous, \$38,344.40. Continuation of Madison Rd., east of Seymour, 2.46 mi.; concrete, \$28,822.90; brick, \$42,694.40; bituminous, \$38,411.10. Estimate for combined contract for Niles Rd. and Lincoln Hwy., concrete, \$31,936.68; brick, \$44,146.62; bituminous, \$39,940.65. Estimate for combined contract for National Rd., from Indianapolis to Hendricks county line; Madison Rd., from Indianapolis to Greenwood, and Broad Ripple-Carmel Rd., concrete, \$29,194.10; brick, \$43,300.90; bituminous, \$39,289.20. The estimates include cost of bridges up to a 20-ft. span.

Ind., Laporte—Residents along Ohio St. are discussing feasibility of petitioning Bd. of Pub. Works for a new pavement. Engr. Thomas has started plans for the paving of Jackson St. and hopes to complete the construction work before winter.

Ia., Burlington—City Council is planning more paving; Starr Ave., Louisa St. and Main St. especially to be considered. City Engr. to prepare plans as soon as possible.

Ia., Des Moines—Bond issue of \$2,000,000 for roads carried. Next question will be to decide which roads are to be paved first. The White Pole Rd. West, the Indianola Rd., the Des Moines-Ankeny Rd. and the River-to-River Rd., west to Dallas Co. line are being considered for first attention. Judging by sentiment of the Board, a 20-ft. cement road costing about \$20,000 per mile is likely to be built following the plan of the Merle-Hay Rd.

Ia., Iowa City—Probably \$250,000 will be expended in Johnson Co. next year for good roads. At least eight and perhaps ten mi. of paving will be laid in this county within the next 15 months. Width of roads to be paved will doubtless be the 20-ft. standard selected by State Hwy. Comm. It is expected that roads will be paved with brick.

Ia., Waterloo—Buchanan Co. adopted paved highways. This means that in connection with paved roads in Blackhawk Co., assured in recent election, there will be a stretch of 48 mi. of paved Hawkeye Hwy. in two counties.

Ky., Pikeville—In special election in Pike Co. question of issuing \$750,000 worth of good road bonds carried.

Ky., Winchester—Action will soon be taken on important improvements provided for by bond issue of \$180,000. Address Clk. of Council.

La., Calcasieu Parish (P. O. Lake Charles)—Will hold an election shortly to issue \$85,000 road bonds.

La., Kinder—At election held to determine whether bonds for road building purposes should be issued, question was decided in the affirmative, and bonds to amount of \$110,000 were voted. These bonds will be used for purpose of building and improving roads in Ward No. 1, in which Kinder is located.

Minn., Duluth—Sixty-fourth Ave. W. was ordered paved 24-ft. wide with curbs and concrete walk on west side. Estimated cost is \$22,408.76.

Minn., St. Paul—City Council passed final order for paving Iglehart Ave., providing for paved thoroughfare along this street. Asphaltic concrete was specified. Estimate for paving from Wabasha St.

to Rice St. is \$12,138, or \$4.12 a front ft., while that for other section is \$53,632, or \$5.77 a front ft.

Miss., Virginia—City Engr. preparing plans and specifications for paving of ten alleys. Estimated cost, between \$25,000 and \$30,000. A. E. Bickford, City Clk.

Miss., Carthage—Election held July 5 for issuance of bonds to the amount of \$150,000 for building improved highways in the county.

Miss., Columbia—Issuance of \$200,000 of road construction bonds by Marion Co. was voted. Chmn., Bd. of Co. Comrs.

Miss., Vicksburg—Election planned in August on \$500,000 road bonds. Address City Clk.

Mont., Laurel—Nearly 60,000 sq. ft. of concrete sidewalk, 11,000 ft. of street curbing and 9,000 ft. of water mains are some of the items on the program of municipal improvement which will be carried out in Laurel this year. Bids upon the work have been called for by City Council, and it is expected that total expenditure will exceed \$30,000.

Mont., Butte—Election in Silver Bow Co., Sept. 2, on \$250,000 road bonds. Address Co. Clk.

Mont., Helena—Five additional miles of concrete paving will be laid in Helena's streets upon completion of plans launched at meeting of Street and Hwy. Impvt. Committee of Commercial Club. Concrete paving is favored because of economy and for its durability and usefulness in this climate.

Mont. (P. O. Virginia City)—An election will be held Sept. 2 to vote on issuing road bonds to amount of \$150,000.

Mo., Chillicothe—Livingston Co. will vote soon on \$1,200,000 bond issue.

Mo., St. Joseph—Ordinances passed for paving with concrete 28th St., Commercial west to Commercial east; for paving with concrete Commercial St., 28th St. to city limits; for paving with concrete Commercial St., 22d to 13½ ft. east of 28th.

Mo., Shelbyville—Election in Shelby Co., July 12, on \$1,000,000 road bonds. Address Co. Clk.

Mo., West Plains—Howell Co. voted bonds of \$500,000 for roads July 1.

Neb., Omaha—City Planning Bd. is contemplating program of traffic way and boulevard projects. Included in program are: Widening of 24th St., opening of 22d St., widening of 20th St., opening of Douglas St., widening of Harney St., and from 33d to 36th Sts.; opening of river drive from Riverview Park to Childs' Point. The Planning Board's Engr. estimates that these projects would cost \$3,000,000.

N. M., Albuquerque—City Comrs. approved plan for 70 blocks of pavement, including three kinds of paving—bituminous, asphaltic concrete and reinforced cement.

N. J., Carlstadt—Borough Council will soon advertise for bids for improvement of Hoboken Rd.; also, many sidewalks are in need of repairs.

N. Y., Albany—Ordinances authorizing expenditure of \$448,000 by city for various improvements have been signed by Mayor Watt. The Mayor signed two ordinances, each calling for expenditure of \$150,000. One is extension of the river front improvement from Westerlo St. to south line of Arch St. An ordinance for improvement of Broadway and appropriating \$69,000 for the project was also signed by Mayor. Other ordinances signed were: Appropriating \$75,000 for grading and paving Western Ave., modifying and re-establishing grade of Western Ave. Appropriating \$3,000 for improvements of grounds around fire alarm station; improvement of Marshall St. to and including intersection of Corlear St.; sewer southerly under the sidewalk of Manning Blvd.

N. Y., Niagara Falls—Revised estimates for road improvement in Niagara Co. call for expenditure of \$306,301.34. These estimates, prepared by Co. Supt Thomas N. Brennen, call for work having total length of 13 mi.

N. Y. (L. I.), Riverhead—Suffolk Co. committed itself to assist in building \$1,000,000 worth of concrete roads in near future; Co. Engr., A. O. Smith, of Port Jefferson. Supervisors gave formal approval to resurface with concrete road between Babylon and Bay Shore. This will cost \$98,700, of which Islip Town will spend \$16,000 to widen the road.

When this resolution was adopted it made \$1,000,000 worth of road work in sight, which includes the Bridgehampton-Bevon road and the Huntington-Fort Salonga road. It is believed that some work will be started within a month.

N. Y., Watertown—Appropriations totaling more than \$70,000 for city improvements, including ratification of bond issue for construction of the new Factory St. bridge, voted by Common Council. Many repairs to streets and sidewalks are contemplated.

N. Y., Salamanca—Common Council rejected bids paving Front and Kent Aves., High, Washington and Linden Sts.; also building sewers in Washington, Center, East and Clinton Sts. Work will be readvertised. C. C. Cheney, City Engr.

N. Y., Watertown—Bd. of Supvrs. appropriated \$208,600 for state and county highways.

N. Y., Watertown—Plans being prepared at local highway office for an 8-ft. side drive of gravel for horses on three roads soon to be constructed. They are Watertown-Philadelphia, Edwards-Gouverneur and Massena-Winthrop Hwys. Also in the future all roads in the division will have the 8-ft. roadway on the side. The division includes Jefferson, St. Lawrence, Lewis and Franklin counties and extends through the Adirondacks to Saranac Lake.

N. C., Rutherfordton—The \$18,300 county road bonds issued for construction of the Charlotte-Asheville Hwy. through Rutherford county were delivered to the Citizens Bank and Trust Co., of Rutherfordton, and Farmers' Bank and Trust Co., of Forest City, the successful bidders.

N. C., Webster—Comrs. Jackson Co. plan to gravel 12 mi. Sylva Rd. to Haywood county line, 20 ft. wide. About \$120,000. W. S. Fallis, care State Highway Dept., Raleigh, Engr.

O., Canton—The resurfacing or repaving of Market Ave. S., Tuscarawas St. E. and of Cherry Ave. N. E. and S. E., are three of the most important street improvements needed, in the opinion of Mayor Poorman and Service Director Zink.

O., Canton—Council may decide to submit to voters at November election a large bond issue to secure money for much needed city street improvements.

Okla., Tulsa—Practically every section of the city came in for its share of paving and improvements at meeting of Mayor and Comrs. Resolution declaring the necessity of providing for improvements, such as grading, paving, curbing, guttering, draining and creation of sanitary and storm sewers in several residence districts was passed.

O., Columbus—Dept. of Agriculture announced that it has approved a number of additional Ohio road-building projects. The projects approved follow: Columbus-Washington C. H. Rd., between Washington C. H. and the Madison county line; macadam or bitumen; length, 12.8 mi.; Federal aid, \$128,000. Dayton-Indianapolis Rd., between Dayton and Eaton, in Montgomery county; concrete; length, 6.05 mi.; Federal aid, \$70,000. Hickville-Defiance Rd., between Sherwood and Defiance, in Defiance county; concrete; length, 2.04 mi.; Federal aid, \$27,750. Bellefontaine-Lima Rd., between Bellefontaine and Wapakoneta, Logan county; concrete; length, 11.23 mi.; Federal aid, \$175,000. Newark-New Lexington Rd., between Somerset and Newark, Perry county; bitumen or concrete; length, 1.84 mi.; Federal aid, \$66,100. Barnesville-Woodsfield Rd., between Barnesville and Somerton, Belmont county; macadam; length, 4 mi.; Federal aid, \$40,000. Morristown-New Athens Rd., between Flushing and national road in Belmont county; macadam; length, 4.45 mi.; Federal aid, \$40,000. Bryan-Wauseon Rd., between Bryan and Stryker, in Williams county; concrete; length, 2.98 mi.; Federal aid, \$35,000. Salem-Unity Rd., between Salem and Washingtonville, in Mahoning and Columbus counties; brick; length, 2.15 mi.; Federal aid, \$15,000. Bryan-Wauseon Rd., between Bryan and Wauseon, in Fulton county; macadam or concrete; length, 6.2 mi.; Federal aid, \$62,000. Marietta-Caldwell Rd., between Marietta and Whipple, in Washington county; concrete; length, 3.026 mi.; Federal aid, \$50,000.

O., Cincinnati—City Council orders special election Aug. 12 to vote on bond issues amounting to \$2,062,200 for improvement of 24 streets.

O., Sandusky—Co. Comrs. passed resolution authorizing issuance of bonds for \$90,500 for improvement of Sandusky-Clyde Rd. Total cost of improvement will be \$116,000.

O., Springfield—Co. has asked for state aid in paving 1.5 mi. on Perrysburg-Holland Rd. in Springfield Twp. and 3.8 mi. on Waterville-Swanton Rd. in Waterville Twp. Paving will be of concrete, of which state's share will be more than \$50,000. The work is part of the 1920 program. Contracts will be let by the state.

O., Toledo—Bids will be received until July 18 on bond issue of \$22,000 for good roads.

Okla., Bristow—City Council has taken initial steps to pave balance of Main St. with brick, about nine blocks in all.

Ore., The Dalles—Under supervision of City Engr. Rodgers, Fairview Ave., leading to I. O. O. F. cemetery, is being regraded and will be treated to heavy coating of heavy asphaltic oil, together plan proves a success, many miles of macadam streets will probably be treated in this manner next year. Main St. will also receive treatment of this kind. City Council is also considering construction of several blocks of hard-surfaced streets next season.

Ore., Ontario—City Council calls for three mi. of paving. Ontario will pave not only its main business streets, but will build hard-surfaced arteries to city limits to meet roads which will be built under state supervision into the city. Bids are being called for under two conditions. One is for immediate construction, the other for work to commence March 1, 1920.

Pa., Ebensburg—Bids will be received here until July 12 for \$138,000 road improvement bonds for Cambria Co.

Pa., Harrisburg—State Hwy. Comrs. Greene has advertised for bids for Bradford-Carrollton Hwy., which will be Federal-aid road and for which residents of Bradford, Pa., donated \$90,000.

Pa., Harrisburg—The Bethlehem Pike, from Philadelphia city line to Springhouse, a distance of seven mi., will be rebuilt and regraded by State Hwy. Dept. The old pike is to be made into an 18-ft. roadway of concrete, with a bituminous top dressing.

Pa., Sharon—Mercer Co. has approved the issue of \$1,500,000 in bonds for permanent good road improvements.

R. I., Woonsocket—Appropriate \$119,500 for highway improvements and \$29,700 for sewer construction. Largest appropriation, \$62,400, is for improvements to River St. There is an appropriation of \$35,800 for paving Hamlet Ave. A third appropriation of \$21,300 is for paving and curbing Arnold St.

S. C., Camden—Issuance of \$60,000 bonds by DeKalb Twp., of Kershaw Co., for constructing roads was voted. Chmn., Bd. of Co. Comrs.

S. C., Orangeburg—City plans election to vote on \$450,000 bonds to pave 9 mi. various streets, 30-50-ft. wide, lay 20.8 mi. cement sidewalks, 25 mi. granite curbing, etc. J. H. Hawes, City Engr.

S. C., Rock Hill—An election is proposed to vote on issuing following bonds: Street improvement, \$450,000; water and sewer, \$50,000.

Tenn., Kaufman—More than \$30,000 worth of street paving will be completed here this summer. Mulberry St. and Houston St. to city limits will be paved. This will give the city about 21 blocks of paving. The paved streets will connect with highway system now being built around Kaufman, for which \$750,000 was voted recently.

Tenn., Memphis—Street work on Felix Ave. and Roland St., totaling \$50,000, was authorized by City Comm. Roland St. will be improved at estimated cost of \$24,647.99, which is a maximum of \$5.05 a front foot. Felix Ave. will be improved at estimated cost of \$23,469.69, a maximum of \$3.64 a front foot.

Tex., Fort Worth—In response to request from Co. Comrs.' Court, W. E. Yancy, Co. Audr., is preparing figures on proposed \$3,450,000 road bond issue.

Tex., Longview—City contemplates extensive paving; also many improvements in water works and sewers to be started. H. N. Roberts, of Tulsa, Okla., has been retained as consulting engineer.

Utah, Salt Lake City—Calls for bids for paving on 7th East St., from 5th East to 13th South, were ordered to be re-advertised by City Comm. The 7th East St. paving includes storm sewer to take

care of the annual spring flood waters. It will also include a new system for running car lines.

Utah, Salt Lake City—City Comrs. decided to pave avenues over which traffic to the city cemetery is greatest. The advertisements calls for bids to pave N St., from Third to Sixth Aves., and Sixth Ave., from H to N Sts. Bd. of Co. Comrs. authorized advertising for an additional three miles of paving on the Redwood Rd. south to the Bingham Hwy., and also 1½ mi. of Vine St., in Murray.

Va., Richmond—Mayor Ainslie and Pub. Wks. Dir. Bolling will attend meeting of Finance Committee, when plan for \$2,500,000 bond issue is to be taken up for consideration. Sentiment is strong in Council for bond issue for streets.

Wash., Chehalis—Lewis Co. Comrs. have granted petition of the settlers along road between Winlock and Cowlitz Prairie for paved road 18 ft. wide, and five mi. long, to be constructed under amended Donahoe road law.

Wash., Seattle—Bd. of Clark Co. Comrs. will receive sealed proposals covering the sale of \$265,000 road bonds. Proceeds from sale of these bonds will be used for improvement of what is officially known as Vancouver-Battleground Rd., work to be done under the Donahoe law.

Wash., Walla Walla—Co. Comrs. have decided to macadamize the Mill Creek Rd. Grading will begin as soon as practicable.

W. Va., Hinton—Summers Co., Jumping Branch Dist., voted \$30,000 bonds and soon receives bids for improving roads. H. L. Batten, Hinton, Engr.

Thorp, Wis.—Paving. Engr. A. R. Garnock, Eau Claire. Drawing plans. 7,500 yds. reinforced concrete paving, curbing and sidewalks.

Wyo., Sundance—It is believed that work will soon start for improving 25 mi. of road between Sundance and Beulah, at cost of \$156,000.

Ont., Toronto—Construction of asphalt pavements is contemplated by the City Council on Bristol Ave., Greenwood Ave., Linder St. and Weston Rd.; also bitulithic pavements on Caledonia Rd. and Exeter Ave., and concrete pavements on Shel-drake Blvd. and lane first west of Roxton Rd. Estimated cost, \$93,949. W. A. Littlejohn, City Clk.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

***Cal., Lakeport**—Bids for Lake Co. side of proposed Mendocino-Lake Co. Hwy. have been rejected by State Hwy. Comm., and new ones will be advertised for immediately. Lowest figure for work, involving 9.4 mi. of grading, including excavation and fence moving, was \$33,000 above engineer's estimate of \$98,040. Work on Mendocino side will begin immediately, however, contract having been awarded J. P. Holland, of San Francisco, lowest bidder, \$119,151.80 for 9.7 mi. of highway between Hopland and the easterly boundary of Mendocino Co. Engineer's estimate, \$100,349.20. Contract for construction work between city of Merced and easterly boundary of Merced Co. was awarded J. E. Lee, of Tulare; bid was \$142,750. Estimate was \$140,725.

***Cal., Sacramento**—Two new contracts were awarded by State Highway Commission in San Francisco. The first, a piece of highway construction work of 8½ miles between Coalina and the Oil King School in Fresno County, was awarded to Joseph G. Donoman Co., of San Francisco. The bid was \$128,996.50.

Ida., Caldwell—Bids were opened by City Council for Caldwell's paving program. The Warren Construction Co. was the only concern to bid on the general paving work, which involves 33 blocks, largely on Cleveland Blvd. and Kimball St.

***Ind., Muncie**—Contract for construction of William Keller Rd., in Washington Twp., Delaware Co., has been let at \$19,989.90, to Oren Broyles, Gaston, Ind.

***La., Colfax**—Meeting of Police Jury was held at which John Randolph, Pres., was authorized to contract with A. E. Perry for building 20.03 mi. of Jefferson Hwy. in Grant Parish and to make tentative agreement for completion of the entire 33 mi. of highway through this parish.

***Minn., Duluth**—To D. H. Clough & Co. was awarded the \$105,932.95 contract for improvement of 1st St., from Sixth Ave. E. to Twenty-third Ave. The firm also got contract for improvement of 8th and

9th Sts., requiring expenditure of \$18,337. Another big contract awarded was that for improvement of Fifty-ninth Ave. W. on the parkway plan. It went to A. N. Nelson on bid of \$58,810.17. August A. Bodin & Sons was awarded contract for improvement of Cook St. on bid of \$59,996.48.

N. J., Elizabeth—Road Committee of Board of Freeholders opened bids for paving of Springfield Ave., New Providence Boro. Weldon Contracting Co. was lowest bidder, the figures being \$40,131.06. The work to be undertaken is 2 miles in length. The paving of intersections of streets running into St. George's Ave., its entire length, will be awarded to C. H. Winans Co., whose bid was \$1,485.30.

***N. J., Perth Amboy**—Contract for extraordinary repair of Smith St., with Warrenite pavement on a concrete base, which was awarded to Utility Construction Co. at last meeting of the Board, was assigned to Liddle & Pfeiffer, of Perth Amboy, on request of the Utility Construction Co.

N. Y., Albany—Following proposals for improvement of highways were received by State Comm. of Highways, 55 Lancaster St., on the 1st of July, 1919:

Road No. 5636, Schenectady County Line-Guilderland, Albany Co. (engineer's estimate, \$118,432.25), 3.98 mi.—Veeder Contracting Co., Inc., Schenectady, N. Y., \$108,213.40; Brown, Lowe & Parker, Schenectady, N. Y., \$113,751; John J. Guinan Contg. Co., Brooklyn, N. Y., \$118,000.31.

Road No. 1362, Vanhorneville-Starkville, Herkimer Co. (engineer's estimate, \$219,538), 5.84 mi.—Frank V. Brotsch Co., Rochester, N. Y., \$213,423; The Rosoff Eng. Co., New York City, \$215,502.80.

Road No. 1363, Paines Hollow-Stone House, Herkimer Co. (engineer's estimate, \$194,514.50), 5.67 mi.—Frank V. Brotsch Co., Rochester, N. Y., \$193,112.

Road No. 1462, North Western-Boonville, Pt. 3, Oneida Co. (engineer's estimate, \$30,013), 0.45 mi.—D. J. Phelan & Co., Utica, N. Y., \$28,283; Frank V. Brotsch Co., Rochester, N. Y., \$28,964; McCarthy & Rock, Winthrop, N. Y., \$30,008.

Road No. 1512, Westchester Co. Line-Mahopac Lake, Mahopac Falls, Putnam Co. (engineer's estimate, \$95,456.25), 3.33 mi.—Samuel Beskin, Beacon, N. Y., \$83,175.25; Frank G. Fowler Cons. Co., Mt. Kisco, N. Y., \$86,210.25; Hughes & Gardner, No. Tarrytown, N. Y., \$93,854.

Road No. 1461, Schuylerville-Gansevoort, Saratoga Co., 9.06 mi. (engineer's estimate, \$308,355.75)—McArthur Bros. Co., New York City, \$339,792.50.

Road No. 1523, Wait Cors-Lape Cors, Saratoga Co., 1.52 mi. (engineer's estimate, \$40,957.50)—Harradine Bros. Co., Inc., Spencerport, N. Y., \$38,682.50; Pearl Investing Co., Inc., Albany, N. Y., \$38,782; H. A. Schaupp, Inc., Albany, N. Y., \$39,627.70.

Road No. 1495, Bridgehampton-Devon, Pt. 1, Suffolk Co., 6.59 mi. (engineer's estimate, \$263,630)—Good Roads Eng. & Contg. Co., Inc., Portchester, N. Y., \$242,205; Claire D. Schlemmer, Islip, N. Y., \$251,344.80; McArthur Bros. Co., New York City, \$306,434.50.

Road No. 1524, Bridgehampton-Devon, Pt. 2, Suffolk Co., 4.99 mi. (engineer's estimate, \$231,500.50)—Good Roads Eng. & Contg. Co., Inc., Portchester, N. Y., \$214,110.50; Claire D. Schlemmer, Islip, N. Y., \$221,362; McArthur Bros. Co., New York City, \$270,062.50.

And also for the completion of the following highways:

Road No. 5609, Port Byron-Weedsport, Cayuga Co., 6.98 mi. (engineer's estimate, \$29,442.85)—Kennedy Cons. Co., Albany, N. Y., \$29,256; Hendrickson-McCabe Cons. Co., Rochester, N. Y., \$29,817.48; I. M. Ludington Sons, Inc., Rochester, N. Y., \$32,231.35.

Road No. 1435, Solon-Gee Brook, Part 1, Cortland Co., 6.07 mi. (engineer's estimate, \$115,150.45)—Dana W. Robbins, Inc., Utica, N. Y., \$111,469.83; Thomas Grady, Rochester, N. Y., \$114,821.08.

Road No. 924-B, Wales Center-Wales, Erie Co., 6.03 mi. (engineer's estimate, \$82,707.40)—Felton Cons. Corp., Buffalo, N. Y., \$81,566.83.

Road No. 5602, Malone Village, Main and Elm St., Franklin Co., 1.99 mi. (engineer's estimate, \$24,837.29)—Arthur F. McConville, Ogdensburg, N. Y., \$25,974.47.

Road No. 1258, Tupper Lake-Long Lake, Pt. 1, Hamilton Co., 5.01 mi. (engineer's estimate, \$114,821.08).

Pa., Ebensburg—Bids for contract of constructing improved roads in West Carroll Twp. opened at Co. Comrs.' office. Lord & Clarke, of Hastings, submitted bid of \$12,878.50 for construction of 1.309 ft. of improved road in Carrolltown Boro.

neer's estimate, \$98,506.18)—Rosoff Eng. Co., New York City, \$91,668.68; John M. Allen, Newark, N. J., \$93,578; W. L. Lawton, Glens Falls, N. Y., \$98,230.58.

Road No. 1315, Cambria-Wilson, Niagara Co., 8 mi. (engineer's estimate, \$137,165.55)—Luke J. Devlin, Rensselaer, N. Y., \$62,560.35; F. J. Mumm Contg. Co., Inc., Buffalo, N. Y., \$129,755.40; Jos. F. Stabell Co., Buffalo, N. Y., \$147,822.20.

Road No. 5545, Schenectady-Duanesburg, Pt. 2, Schenectady Co., 5.62 mi. (engineer's estimate, \$71,426)—J. J. Malloy, Schenectady, N. Y., \$66,450.40; H. A. Schaupp, Inc., Albany, N. Y., \$73,593.75.

Road No. 5632, Sodus-Alton, Wayne Co., 5.85 mi. (engineer's estimate, \$9,376.30)—Hendrickson-McCabe Cons. Co., Syracuse, N. Y., \$8,517.76; Harradine Bros. Co., Inc., Spencerport, N. Y., \$9,394.80; Cleveland & Sons Co., Brockport, N. Y., \$13,934.20.

And also for repair of following highways:

No. 1208, Road No. 490, Rensselaer Co. (engineer's estimate, \$88,808.90)—Troy Contg. Co., Inc., Troy, N. Y., \$85,688.90; M. Fitzgerald, Hoosick Falls, N. Y., \$87,090.40.

Rep. Con. No. 1224, Road No. 16, Ulster Co. (engineer's estimate, \$57,992)—John F. Gallagher, Kingston, N. Y., \$54,295; F. W. Hamilton, Rochester, N. Y., \$57,856.50.

N. Y., Oswego—Only one bid for construction of improved highways was received at Dept. of Works office. The bid submitted was that of J. A. Culkin of this city, whose bid was \$113,966.40 for rock cut stone, and \$115,471.40 for synite. Both bids submitted by Culkin Co. are over engineers' estimate, which is said to be \$100,000, and it is expected that other bids will be called for by the department. Specifications call for construction of 60,020 cu. yd. of concrete, and an equal amount of bituminous road.

N. Y., Sanborn—The County Bd. of Supervisors awarded Wheatfield Town Board the contract for constructing 3½ miles macadamized section of the Lockport road, extending eastward from the Ward road, at town's estimate of \$47,625.20.

O., Kenton—Contract for Lima-Bellefontaine Pike has been awarded L. R. McArthur at bid of \$78,000.

Okla., Tulsa—Contract for widening Boulder Ave. from Third to Sixth St., eliminating all parkings and paving with Trinidad asphalt to width of 56 ft., was awarded F. P. McCormick at city engineer's estimate of \$18,534.21. Boston Ave. will be made 20 ft. wider from Fourth to Fifth Sts., at cost \$5,475.53. F. P. McCormick was also awarded contract for paving Marshall and Main Sts. and Cheyenne Ave., a distance of approximately 8 blocks, Texaco asphalt to be used, and cost being \$56,985.23.

Ore., Klamath Falls—Contracts for five units of paving in Klamath Falls have been let by City Council to Warren Construction Co. at total cost of \$128,003.57.

Pa., Harrisburg—State Highway Commissioner Sadler awarded four contracts to low bidders for road construction in Dauphin, Columbia and Northumberland Counties, on proposals opened June 24. Approximately 66,118 ft. of roadway will be improved. Further consideration is being given to bids received on the same date for another Northumberland Co. and a McKean Co. project.

Pa., Reading—Contract for sheet asphalt work was awarded Dewey Cement Gun Construction Co., Allentown, Pa.

R. I., Cranston—A contract for resurfacing Cranston St. with sheet asphalt was let by Contracting and Purchasing Board of the City Council. Contractor is Edward P. Tracy, who did similar work on Broad St., and price is \$1.52 per sq. yd. The surface to be covered has total of 22,858 sq. yds.

Tex., Gonzales—Special meeting of Co. Comrs. Court was held recently for purpose of opening bids for construction of Hwy. No. 3, through Rd. Dist. Nos. 2 and 4. W. T. Montgomery, who is in charge of the construction of that portion of the highway from Gonzales to the Guadalupe Co. line, was awarded the contract for clearing, grubbing and grading the road. The McCall-Moore Engrg. Co., of Waco, was awarded cement construction work. A number of bids were submitted.

Va., Lynchburg—Bids for improvement of Seventh St. were opened by joint Council Committee on Streets. Bids were submitted by J. R. Ford Co., Inc., W. T. Jones, and O. M. Burnett & Co., which bid respectively \$11,000, \$9,600 and \$9,-

300. The committee will recommend to City Council that contract be awarded lowest bidder, O. M. Burnett & Co.

Wash., Enumclaw—Contract has been awarded by Council to Larson Construction Co., Perkins Bldg., Tacoma, for \$64,063, covering all improvement work planned for local improvement district No. 7, according to O. E. Magnuson, Town Clerk.

Wash., Olympia—Contracts for highway improvements totalling \$524,584.41 were let by State Hwy. Comm. Projects for which contracts were let were the following: Paving seven mi. of Pacific Hwy., from Olympia city limits south in Thurston county. Contract let to Albertson, Cornell & Simpson, of Tacoma, on bid of \$189,200.29. Engineer's estimate, \$186,941. Paving 1½ mi. on Pacific Hwy. east of Everett across Ebey Slough, connecting a gap between pavement north and south. J. W. Hoover & Co., of Everett, on bid of \$32,203.72. Estimate was \$33,978. Five and a half mi. of surfacing on Pacific Hwy., in Cowlitz Co., awarded to D. A. Williams, Tacoma, on bid of \$34,038. Estimate was \$36,600. Paving four mi. of Sunset Hwy. east of Spokane on the Apple Way; Clifton, Applegate & Toole, of Spokane, were given contract at \$116,894.80. Estimate was \$98,866. The grading and graveling project on Chelan and Okanogan Hwy. was let on two contracts. Contract from Brewster to Malatt awarded to Robert A. Sloan, Seattle, for \$56,654.50. Engineer's estimate was \$47,661. Second contract, covering a strip between Tanasket and Oroville, went to Anderson & McDowell, of Molson, for \$51,324.75. Estimate, \$52,120. The contract for grading and graveling five mi. on the Sunset Hwy., from Hartline east to Lincoln county line, was given to Arthur A. Proulx, of Almira, on bid of \$44,268.35. Estimate was \$41,134.

Wash., Spokane—Firms awarded contracts for eight mi. of concrete paving to cost approximately \$250,000, on Sunset Blvd. and Apple Way, and are expected to begin work immediately. J. M. Clifton, of the Clifton, Applegate & Toole Co., will arrive from Olympia to take charge of the \$116,800 paving work of his company on the Apple Way. It will pave to Liberty Lake junction. C. S. Greene, of Standard Asphalt Paving Co., which has \$131,000 contract for completing the Sunset Blvd., will also arrive from Olympia to direct the paving of four mi. of road west of Deep Creek with concrete.

Wash., Olympia—Bids opened by State Highway Commr. for paving of 8 miles of Pacific Highway, between Mt. Vernon and the Snohomish county line resulted as follows: McAdam & Co., \$244,664.28; Independent Asphalt Pave Co., \$255,918.18; Kaiser Paving Co., \$260,045.06; Puget Sound B. & D. Co., \$260,660.50. All bidders from Seattle. Contract let to McAdam Co. Contract for paving three miles of Olympic Highway west of Montesano was let to Aberdeen Paving Co., of Aberdeen, at \$80,333.10.

Wis., Milwaukee—Street and alley paving contracts for \$132,404.83 were awarded by Department of Pub. Works. Street paving jobs were let as follows: Badger Construction Co., 18th St., asphalt, \$22,868.96; A. H. Prange, Clinton St. and Kinnickinnic Ave., sandstone, \$36,198.31; White Construction Co., 56th, 57th, 58th and 59th Sts., asphalt, \$6,589.97; Howell Ave., asphalt, \$18,417.64; F. P. Caughlin Co., Shepard Ave., asphalt, \$6,743.10. Twenty-one alley paving jobs were let for \$41,586.76.

SEWERAGE AND SANITATION

Cal., Willows—An election to vote upon proposed \$40,000 sewer bond issue to install sewer system in parts of Willows not included in original sewer district has been called for July 8th by Town Trustees. Plans and specifications have been adopted.

Ga., Jessup—Election will be held next month to vote on issuing sewer bonds to amount of \$30,000.

Ia., Dubuque—City engineer preparing plans for sewer system at end of Rhomburg Ave. that will prevent repetition of damage done by recent storms.

Ia., Des Moines—The South Side sewer system will be put up for vote by City Council. The plans call for construction of more than 30 mi. of sewer at estimated cost of a half-million.

Ky., Louisville—D. B. Edmiston, Clk., Bd. of Aldermen, informs us that an issue of \$1,000,000 sewer bonds will be voted on at election Nov. 4, 1919.

Mass., Brockton—\$75,000 bond issue for erection of sewage disposal plant has been passed. Specifications have been prepared by City Engr. Harold S. Crocker, and may be obtained from him.

Mass., Springfield—Sewer bonds to amount of \$50,000 have been accepted.

Minn., Duluth—City Council will consider ordinance requesting bond issue of \$400,000 for construction of trunk sewers and improvement of street intersections.

Minn., Duluth—City Council considered ordinance appropriating \$40,287 to construct storm sewer in two streets.

Minn., Duluth—Largest appropriation authorized was for storm sewers in Woodland and Wallace Aves., costing \$46,695.50. An appropriation for sewer in 51st St. Alley West and in Roosevelt St., amounting to \$5,091.20, was also authorized. Among storm and sanitary sewers ordered were the following: Sanitary sewer in Central Alley and Eighth Alley, at estimated cost of \$825.83; sanitary sewer in Princeton Alley, at estimated cost of \$1,824.02; combination storm and sanitary sewer to be extended from Eighteenth Ave. E. to lake, at estimated cost of \$1,075.25; storm sewer in Tacony St. at estimated cost of \$1,614.80.

Minn., Ely—Will vote on bond issue of \$60,000 to build sedimentation basin and water and light improvements.

Neb., Kearney—Contract for building a State and Federal-aid road from Kearney to Pleasanton, a distance of about 20 mi., has been let to A. L. Cook, of Ottawa, Kan., who presented lowest bid, asking 37 cents a yard for removing approximately 170,000 cu. yds. of dirt. Total expenditure for road will be about \$64,500.

N. J., New Brunswick—Plans for the construction of storm sewer here have been approved along the stream between Lee Ave. and Remsen Ave.

N. Y., Beacon—Plans ready for trunk sewer and bond issue of \$60,000 will be asked for. City Engr., Earl Weller.

N. Y., Cohoes—Will probably have to install sewage disposal plant and rearrange entire city sewage system at cost of \$300,000 to \$350,000 during coming year.

N. Y., Rye—Village intends to install sewer system at estimated cost of \$246,000. Village Pres., Theodore Fremd.

N. Y., Watertown—Bd. of Pub. Wks. was authorized to build sewerage system in Bronson St. The construction of sewer in Scio St., where the open sewers are now in use, was discussed and immediate installation was advised by E. W. Sayles, City Engr.

N. C., Wendall—Election to be held July 14 to vote on bonds of \$44,000 for sewers.

O., Cincinnati—City Council orders election Aug. 12 to vote on bond issues of \$65,000, \$150,000 and \$800,000 for construction of sewers.

O., Cleveland Heights—Has authorized \$30,000 sewer bonds.

O., Wyoming—Vil. Clk. Geo. H. Eversman will receive sealed bids until July 16 for 5 per cent semi-annual sewer extension bonds to amount of \$25,000.

Pa., Easton—Is to vote on \$700,000 sewer bond issue.

Pa., Johnstown—Guarantee Trust Co., of New York, bid in \$375,000 worth of municipal bonds at premium of \$7,993.13, this firm being one of ten bidding for bonds which are being sold to provide funds for sanitary sewers.

S. C., Batesburg—City election, July 11, to vote on \$40,000 bonds to build three mi. sewerage system in principal business and residential streets.

S. C., Orangeburg—City plans election to vote on \$75,000 bonds to lay 4.4 mi. sanitary sewers and 1.7 mi. storm sewers in various streets, etc. J. W. Hawes, City Engr.

S. D., Brookings—Carried at election \$48,000 storm sewer bonds.

S. D., Sioux Falls—City Comm., at adjourned meeting, decided to advertise for bids for three sewer contracts on jobs on Duluth, between 21st and 22d; on 10th St. and on Tenth Ave.

Tex., Longview—See "Streets and Roads."

Tex., Fort Worth—City Commission decided to close its option on 60 acres of land north of Dallas pike, which will be used as site for municipal sewage disposal plant, erection of which has been long deferred. Commr. Lord stated that work would in all likelihood be started

Cal., Sacramento—The State Highway Commission received the following bids June 9 for the construction of a state highway in Monterey County, Division V, Route 2, Section F, Federal Aid Project No. 15. Bids submitted by highest and lowest bidders are itemized. Other bids received were Cahill-Vensano Co., San Francisco, \$242,872.45; Mercer-Fraser Co., Eureka, Cal., \$273,958.50; Tibbitts-Pacific Co., San Francisco, \$276,771.00; Ross Construction Co., Sacramento, \$268,000.00; Clinton Construction Co. of Cal., San Francisco, \$241,359.30; San Francisco Bridge Co., San Francisco, \$244,575.00.

Items	Quantities	Engineer's Estimate		Healy-Tibbitts Const. Co., San Francisco		W. M. Ledbetter, Los Angeles	
				Bid	Amount	Bid	Amount
Steel spans, complete.....	14 each		\$8,000.00	\$8,059.60	\$112,834.40	\$10,200.00	\$142,800.00
Cast iron drains.....	56 each		7.00	5.00	280.00	10.00	560.00
Portland cement concrete Class "A" (piers above elevation 277.92).....	536 cu. yds.	12.25	6,566.00	15.00	8,040.00	21.50	11,524.00
Portland cement concrete Class "A" (pier footings below elevation 277.92 and above elevation 256.00).....	790 cu. yds.	18.50	14,615.00	20.00	15,800.00	31.50	24,885.00
Portland cement concrete Class "A" floor on steel spans.....	762 cu. yds.	20.00	15,240.00	15.00	11,430.00	22.50	17,145.00
Portland cement concrete Class "A" trestle approach.....	1,324 cu. yds.	25.00	33,100.00	20.00	26,480.00	26.00	34,424.00
Reinforced concrete piles (making and driving).....	6,560 lin. ft.	1.75	11,480.00	3.50	22,960.00	3.00	19,680.00
Wooden piles (pier footings).....	3,375 lin. ft.	1.25	4,218.75	1.50	5,062.50	1.50	5,062.50
Double pile—continuous dikes.....	2,200 lin. ft.	6.00	13,200.00	10.00	22,000.00	7.00	15,400.00
Cross dikes.....	760 lin. ft.	2.80	2,128.00	4.25	3,230.00	3.50	2,660.00
Asphalt surface.....	6,200 sq. yds.	1.00	6,200.00	1.00	6,200.00	2.25	13,950.00
Totals.....			\$219,139.75		\$234,316.90		\$288,090.50

The materials furnished by the state are reinforcing steel, portland cement—\$40,318.05.

Cal., Sacramento—The State Highway Commission received the following bids June 9 for constructing a state highway in Merced County, Division VI, Route 18, Section A, Federal Aid Project No. 12. Bids given by lowest and highest bidders are itemized. Other bids received were Bates & Borland, Oakland, \$159,645.00; J. E. Lee, Tulare, \$142,750.00; White & Gaskill, Long Beach, \$147,960.00; Palmer & McBryde, San Francisco, \$156,491.81.

Items	Quantities	Engineer's Estimate		Geo. S. Benson & Son, Los Angeles		James E. Johnston, Tracy	
				Bid	Amount	Bid	Amount
Excavation (ordinary).....	39,000 cu. yds.	\$0.95	\$37,050.00	\$1.00	\$29,000.00	\$0.90	\$35,100.00
Excavation (borrow).....	9,400 cu. yds.	1.15	10,800.00	1.20	11,280.00	1.05	9,870.00
Portland cement concrete Class "A" pavement.....	15,000 cu. yds.	5.50	82,500.00	6.80	102,000.00	5.75	86,250.00
Portland cement concrete Class "A" (culv. and mons.).....	381 cu. yds.	20.00	7,620.00	20.00	7,620.00	16.00	6,096.00
12-in. corrugated metal pipe.....	624 lin. ft.	1.00	628.00	1.00	628.00	1.00	628.00
18-in. corrugated metal pipe.....	228 lin. ft.	1.25	285.00	1.50	342.00	1.20	273.60
24-in. corrugated metal pipe.....	74 lin. ft.	1.50	111.00	2.00	148.00	1.50	111.00
Property fences (moving and resetting).....	4.0 miles	200.00	800.00	260.00	1,040.00	150.00	600.00
Guard rails.....	900 lin. ft.	.90	910.00	.80	720.00	1.25	1,125.00
Hauling and setting monuments.....	74 each	1.50	111.00	2.00	148.00	2.00	148.00
Totals.....			\$140,725.00		\$162,926.00		\$140,201.60

The materials to be furnished by the state are reinforcing steel, portland cement, gravel and sand, corrugated metal pipe—\$102,500.32.

Cal., Sacramento—The State Highway Commission received the following bids June 9 for constructing a state highway in Fresno County, Division VI, Route 10, Section D, Federal Aid Project No. 11. Bids submitted by the highest and lowest bidders are itemized. One other bid was by W. A. Dontanville, Arroyo Grande, for \$138,467.30:

Items	Quantities	Engineer's Estimate		Palmer & McBryde, San Francisco		Joseph G. Donovan, Los Angeles	
				Bid	Amount	Bid	Amount
Excavation without classification.....	26,000 cu. yds.	\$0.75	\$19,500.00	\$1.30	\$33,800.00	\$0.95	\$24,700.00
Portland cement concrete (pavement) Class "A".....	14,374 cu. yds.	6.00	86,244.00	7.50	107,805.00	6.75	97,024.50
Portland cement concrete (culv. and mons.) Class "A".....	225 cu. yds.	20.00	4,500.00	25.00	5,625.00	25.00	5,625.00
12-in. corrugated metal pipe.....	472 lin. ft.	1.00	472.00	.80	377.60	1.00	472.00
18-in. corrugated metal pipe.....	148 lin. ft.	1.25	185.00	1.00	148.00	1.50	222.00
24-in. corrugated metal pipe.....	208 lin. ft.	1.50	312.00	1.20	249.60	2.00	416.00
30-in. corrugated metal pipe.....	102 lin. ft.	2.00	204.00	1.50	153.00	2.50	255.00
Guard rail.....	224 lin. ft.	.90	201.60	1.00	224.00	.75	168.00
Monuments.....	76 each	2.00	152.00	2.00	152.00	1.50	114.00
Totals.....			\$111,770.60		\$148,534.20		\$128,996.50

The materials to be furnished by the state are reinforcing steel, portland cement, gravel and sand, corrugated metal pipe—\$112,473.30.

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before Sept. 1. The plant being a large structure, considerable time will be required to complete it.

Wis., Cumberland—Sewerage system; Engr., L. P. Wolff, Guardian Life Bldg., St. Paul, Minn. A. O. Norton, City Clk. Drawing plans.

Wis., West Bend—City Council, C. P. Heipp, Clk.; Jos. F. Huber, Mayor, taking bids for sewers in various streets.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

***Ill., Chicago**—Bd. of Local Impvts. awarded following contracts: Warrant 46928—Tile pipe sewer, with brick manholes and brick catch-basin, in Alley, from East 37th St. to point 500 ft. south, A. Frank Ranieri. Warrant 46809—Tile pipe sewer, with brick manholes, brick catch-basins and tile pipe wing sewers, in No. Moody Ave., to Carmine Roberts. Warrant 46931—Tile pipe sewer, with brick manholes and brick catch-basins, in Yates Ave., from East 90th to East 92d St., to Christ Anderson & Son. Warrant 46932—A system of brick and tile pipe sewers, with brick manholes and brick catch-basins, in the following streets: North side of E. 93d St., from the west side of Stony Island Ave. to Jeffery Ave.; south side of E. 93d St., from the east side of Stony Island Ave. to Jeffery Ave.; Constance Ave., from E. 93d St. to E. 92d St.; Bennett Ave., from E. 93d St. to E. 92d St.; Euclid Ave., from E. 93d St. to E. 92d St.; east side of Stony Island Ave. from E. 92d Pl. to 880 ft. south of E. 93d St., and E. 92d Pl., from Stony Island Ave. to 20 ft. west of Macfarlane Ave., to Christ Anderson & Son.

***La., Aurelia**—Councilman Joe M. Lewis, of Sloux City, awarded contract for construction of \$30,000 sewerage system for town of Aurelia, La.

***Mo., Kansas City**—Contract for building main sewer and laterals in Dist. 334, Div. 5, awarded by Bd. of Pub. Wks. to the Kinlen Construction Co., lowest bidder, for \$35,836.50. Both storm and sanitary sewers are provided for and construction is to be of vitrified segment block, vitrified clay pipe and concrete. The improvement will drain section in southwestern part of the city in vicinity of Meyer Blvd. and Wornall Rd.

***O., Barberton**—W. J. Irvin & Son, of Greenville, have contract for West End lateral sewer at their bid of \$125,000.

***O., Youngstown**—Patrick Grady awarded contract for construction of six sewers in Pleasant Grove at cost of \$45,281.

Pa., Bethlehem—The following bids for constructing Centre St. storm sewer, between Lehigh and Broad Sts., were opened: R. S. Rathbun Contracting Co., 24-in. vitrified pipe, \$3.28 a lin. ft.; 20-in. pipe, \$2.25; 12-in. pipe, \$1.23; manhole, \$70, and extra concrete, \$14; S. L. Cyphers, items 1, 2, 3, 4 and 5, \$2.65, \$2.20, \$1.51, \$69 and \$16, respectively; G. R. Hardner, items 1, 2, 3, 4 and 5, \$3.45, \$2.65, \$1.55, \$90 and \$8, respectively; Frank J. Groman, Charles Groman, James Groman and S. W. Chiles, items 1, 2, 3, 4 and 5, \$3.15, \$2.32, \$1.25, \$98 and \$24. Mr. Cyphers was lowest bidder, according to tabulation of Engineer Fox.

WATER SUPPLY

Cal., Sacramento—Bond issue of \$1,800,000 for purpose of installing filtration plant and water works is carried.

Colo., Sterling—Bond issue of \$250,000 for water works extension has been accepted.

Fla., Ft. Myers—City election in August to vote on \$45,000 bonds to extend water mains.

Ill., Rock Island—An ordinance providing for laying of 6-in. water mains on 28th St., between Eighteenth and Twentieth Aves., and Nineteenth Ave., between 27th and 30th St., and the laying of 8-in. sewer pipes on 28th St., between Eighteenth and Twentieth Aves., and on Twentieth Ave. to 27th St. was adopted unanimously. This improvement will cost \$11,272.

La., Farragut—Has voted \$25,000 water works bonds.

Kan., Elkhart—Held an election July 2, to vote on \$60,000 water and light bonds.

Mass., Wakefield—Finance Committee recommends appropriation of \$40,000 for water works improvement. Address Chmn. of Water and Sewerage Bd.

Mont., Hardin—Water bonds to amount of \$9,600, to provide for extension of water system, have been sold by Town Council.

N. J., Bayonne—City's water system is to be greatly improved and supply increased. Address Supt. Griffin.

N. J., Perth Amboy—A resolution is before Council providing for issuance of water bonds to amount of \$50,000.

N. C., Wendall—City will hold election July 14 to vote on \$44,000 bonds for water works.

O., Bellevue—Water works bonds for \$135,000 have been sold. Address Supt. of Dept.

O., Canton—Final action on adoption of resolution authorizing city to vote for issue of \$1,280,000 in bonds for improvement of city water works system will be taken at meeting of Council.

O., Norwood—Water softening system; \$50,000. Engr., Allen Kissinger, City Hall. Take bids shortly.

O., Toledo—Serv. Dir. Goodwillie has asked Council to authorize two bond issues totaling \$900,000 for construction of new service main and an addition to present filtration plant.

Ore., Portland—On request of owners of warehouses on East Side waterfront, Dock Comn. joins in request for construction of large water main along the docks for fire protection.

Pa., Harrisburg—City Comr. Lynch estimated it would cost \$50,000 to extend sewerage system throughout 30th Ward. He will introduce ordinance in City Council which will permit Comrs. to decide question next fall. Comr. Lynch thinks it would be practical to construct sewer along Spring Creek, connecting with existing one at 19th St.

Pa., Latrobe—Reservoir; \$250,000; on Shoup Farm. Engr. and Gen. Contr., J. G. White & Co., Inc., 43 Exchange Pl., N. Y. City. J. J. Walker, Supt., Latrobe Water Co., Latrobe.

Pa., Pittsburgh—Special election for \$900,000 bonds for extension of water system and other improvements to be held.

Tex., Longview—See "Streets and Roads."

Tex., Paris—At meeting of Council Mayor Crook was authorized to make improvements at City Lake, including new filtration equipment. Booster pump will be installed between the lake and the city to increase water pressure.

Utah, Murray—Murray voted in favor of \$125,000 water bond issue. Present plans include further development of spring at mouth of Cottonwood Canyon, from which there is now a flow of one and a quarter second-feet of water.

Wyo., Lusk—Town Clk. D. E. Goddard calls for sealed bids until July 12 for following bonds: Water improvement, \$200,000; sewer, \$30,000.

Ont., Windsor—The Windsor Water Comn. contemplates installing filters. Estimated cost, \$300,000. J. F. Smith, Chmn.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Ida., Caldwell—Water works improvement bonds are to cover expense of replacing present wooden water mains in the paving area with cast iron pipes. Bids for this work were submitted by Green Construction Co., of Salt Lake, \$27,925.52; Caldwell Plumbing and Heating Co., \$27,958.17, and the J. H. Rorbes Co., of Caldwell, \$28,096.10. These bids were considerably lower than the sum which the city had allotted to defray cost of laying water mains.

***Minn., Bemidji**—Phelps-Drake Co., of Hibbing, was awarded contract by City Council for overhauling water system of the city and extending the system, contract being for \$30,852.92.

***Mont., Polson**—At special meeting of City Council bids for water works extension were opened, and after consideration contract was let to Nelson & Cordus, of Eureka, for \$13,799.45. The only other bid was from J. A. Hyer, of Polson, for sum of \$14,408.47.

Wash., Seattle—Keen competition was in evidence in bids submitted to Port of Seattle Commission in response to its call for figures for laying water pipes to and underneath Pier B, now building at Smith's Cove. Chief Port Engineer Geo. H. Nicholson placed cost at \$40,000. This estimate was somewhat above low bid of Norton & Spangler, Henry Bldg., which company submitted figure of \$35,185 for the work, this to include all pipes underground and up to the level of the deck of the pier. Eleven bids in all were submitted for the contract, highest being \$44,184.

LIGHTING AND POWER

Cal., Avalon—The following bonds carried at a recent election: Light and water, \$88,000; gas plant, \$55,000.

Ill., Springfield—Plans being made for new lighting system for downtown district.

Ind., Logansport—Council has been petitioned to install new system of electric light. Address Mayor Barner.

Ia., Storm Lake—Citizens of Storm Lake will vote on \$100,000 bonds for municipal plant. Roy V. Kinne, City Clk.

Kan., Elkhart—See "Water Supply."

Kan., St. Johns—Election to vote \$40,000 bonds for erection of power for city water and lights systems carried. Work will start immediately.

Kan., Washington—A municipal light plant is contemplated.

O., Hamilton—The citizens' electric light committee recommend the erection of modern municipal light plant.

Tex., Luling—Luling Commercial Club to circulate petition asking that Bd. of Comrs. order election on city bonds of \$75,000 for purpose of installing municipal light and water plants.

Wis., Elroy—Bids in for \$10,000 electric light bonds. Mark McGinty, City Clk.

Wis., Greenbay—Special committee has been appointed to secure new system of lighting for city. Address Cecil Baum, of the committee.

Wyo., Lusk—See "Water Works."

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

***Mo., Kansas City**—The Kansas Side City Comrs. awarded contract for generators for the municipal electric light plant to the Westinghouse Electric Co. Cost of the generators will be about \$232,000 and contract calls for delivery in 90 days. Contracts for other machinery, boilers, poles and necessary equipment have been awarded. The additions will double the capacity of the present plant.

N. Y., Watertown—Northern New York Utilities, Inc., let contract for largest hydro-electric development it has ever undertaken. It is construction of a 2,450-ft. canal near village of Black River, where company already has a power plant. The new development will increase the head of water from 19 to 34 feet.

FIRE

Cal., San Francisco—City voted \$10,000 bonds for fire alarm system.

O., Akron—Three new fire stations are to be built.

O., Bluffton—Council is considering purchase of motor fire truck.

O., Deshler—The question of purchase of motor fire truck is being considered by the Council of this village.

O., St. Bernard—Geo. Schroeder, Audr., will sell \$65,000 worth of bonds for building fire engine house and for purchase of fire apparatus.

O., Salem—Extension of city water mains on East High St., to afford better

Debit Column of Standard Road Construction

ORIGINAL COSTS

Data quoted below is taken from State Records.

State Road No. 142, Saugerties to Woodstock, part 3, length 2.85 miles less than 3 miles 14 feet wide. Its first cost was in 1904.....\$39,317.12

Road No. 743. Babylon to Bayshore, a trifle over 4 miles long, was completed early in 1909. Its first cost in 1908.....\$40,537.00

MAINTENANCE AND REHABILITATION

Maintenance to 1912.....	\$8,319.00
Resurfacing in 1910.....	8,480.00
Resurfaced in 1912.....	26,648.00
Repairs in 1913.....	4,522.29
Repairs in 1914.....	3,959.66
Repairs in 1915.....	17,620.33

Total Cost\$111,866.40
Cost per mile, \$39,251.30.

Repairs to 1912, inclusive.....	\$10,194.00
Resurfacing in 1912.....	38,750.00
Maintenance 1914-1915.....	3,362.00
Now to be resurfaced with concrete, bids called for, estimated cost.....	40,000.00

Total Cost\$132,843.00
Cost per mile, \$33,200.75.

RECAPITULATION. ROADS

(Roads 142, 417, 418, and 743)

*Now let us take roads Nos. 142, 417, 418 and 743. Their total mileage is 24.23 miles, almost 24½ miles. Their original cost was \$271,736.12. From the period in which they were built and until the close of 1915, these four roads in the aggregate have cost to maintain, repair, or call it what you will, \$331,806.40. That is, their maintenance cost in money \$60,039.12 more than the original cost for building them.

The Credit Column of Willite

Armour plate roads

Based on conservative calculation cost of over 20 miles Willite roads of comparable kind, laid in the past 4 years and making no allowance for excessive costs the past 2 years, the first cost of above roads would not have exceeded \$28,000.

Based on actual maintenance experience covering over 4 years, the maintenance would not have exceeded 1c a square yard.

Recapitulation of Savings by Willite

On original cost \$20,000

On maintenance \$45,000

Savings upon resurfacing \$50,000

Capitalize these savings and invest them in roads would mean 10 miles built out of the tribute paid to standard road material and standard methods of paying for business. High original costs—maintenance wastes that represent annuities taken from the taxpayer.

Investigate these facts, figures and calculations. It is the duty of every public officer, banker, taxpayer and citizen. They will bear the closest scrutiny.

Read these articles every other week on Page 5

fire protection to that district, has been requested of Council.

O., Struthers—Council has instructed Solicitor to prepare the necessary legislation for bond issue of \$22,000 for new system of fire protection. Bond election will be put to popular vote this fall.

O., Willoughby—The Watson Engineering Co., Hippodrome Bldg., Cleveland, has submitted preliminary sketches for proposed high level bridge on which bond issue was voted July 8.

O., Youngstown—D. E. Sweeney, City Auditor, will sell bonds July 21, in the sum of \$3,500, proceeds from which to be used for purchase of hook and ladder service truck.

O., Xenia—New apparatus to be bought to complete motorization of department. Address Chmn. of City Comn.

Pa., Canonsburg—Council contemplates buying a fire truck.

Pa., Farrell—Fire station and several pieces of apparatus were recently destroyed by fire and new apparatus to be bought. Address Clk. of Council.

Pa., Oakhurst—Proposition to purchase fire apparatus. Address Clk. of Vil.

Pa., Sharon—Citizens assert that fire department has not enough apparatus for adequate protection.

Pa., Sharpsburg—Two fire trucks are to be purchased.

Pa., West Chester—Town considering purchase of fire apparatus. Address Chief Fire Dept.

Va., Richmond—Appropriation of \$148,000 has been made for motorization of the fire department. Address Chief.

Va., Richmond—Mayor Ainslie signed resolution appropriating \$148,000 to purchase motor equipment for fire department. It is expected if deliveries on new machines can be secured that department will be entirely motorized by first of the year.

W. Va., Welsh—City voted bonds of \$35,000, part for purchase necessary fire apparatus. Address the Mayor.

Wis., Eau Claire—Additional fire apparatus is to be purchased.

BRIDGES

Cal., Marysville—Plans and specifications for 10 bridges to cost approximately \$36,050 were adopted by Board of Supervisors of Yuba County. Plans were drawn by County Surveyor L. B. Crook.

Ga., Savannah—Altamaha bridge will be built, probably within the very near future. The Beasley Contracting Co., of Savannah, the Austin Contracting Co., of Atlanta, and a St. Louis firm have made a survey of a site at Sisters Bluff, and each separately submitted a bid for the job. Likely these bids will be opened in Savannah in the office of the Citizens & Southern Bank. The citizens in vicinity of proposed site of the bridge have subscribed \$75,000 and have agreed to pay in about \$45,000. The span may cost between \$100,000 and \$125,000, according to preliminary estimates.

Ind., Indianapolis—State Bd. of Tax Comrs. has approved bond issue of \$55,000 for Wayne Co. to complete bridge on National Rd. over White River at Richmond.

Ind., Richmond—Wayne Co. has authorized \$55,000 bridge bonds.

Mass., Northampton—It is planned to expend about \$18,000 for concrete bridge over Mill River. Address Clk. of Hampshire Co.

Minn., Duluth—Messrs. A. B. Leach & Co., of Chicago, were successful bidders for bridge bonds to amount of \$90,000.

Mont., Hamilton—It is planned to expend \$20,000 for bridge about 280 ft. long, over Bitterroot River, Ravalli Co. Address Co. Clk.

Mont., Thompson Falls—Sanders Co. election, Sept. 2, to vote on \$75,000 bonds to build bridges. T. Johnson, Thompson Falls, Engrs.

N. Y., Watertown—See "Streets and Roads."

O., Akron—Bond issue of \$210,000 for construction of viaduct over the Ohio Canal on State St. will probably be authorized.

O., Elyria—Bridge; \$40,000. Engr., F. P. Crosse, Court House, Lorain Co. Start plans soon.

O., Marion—Bridge and seven culverts: about \$35,000. Engr., Chas. Ash, Court House. Plans drawn.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

***Cal., Redding**—F. Rolandi, contractor on Redding-Tower House lateral, has let sub-contract for building all concrete culverts on the unit to De Waard Bros. for sum approximating \$40,000. De Waard Bros. built the concrete culverts and bridges between Redding and Grey Rocks at a cost \$27,000. In addition to \$40,000 worth of concrete work on the Redding-Tower House unit, the county will have to build 3 concrete bridges.

N. J., Elizabeth—County Engineer Bauer announced that Charles Arny, of 14 High St., was lowest bidder for erection of new structural iron bridge over Rahway River, at Monroe St., Rahway. His bid was \$24,590.

MISCELLANEOUS

Cal., Waterford—Waterford Irrigation Dist. will receive sealed bids until July 12 for \$205,000 improvement bonds. J. R. Browder, Sec.

Ind., East Chicago—Park bonds of \$120,000 have been accepted.

Ind., Indianapolis—A preliminary resolution has been adopted for acquisition of 12 acres north of Fall Creek Parkway for a neighborhood park, by Bd. of Park Comrs. The Bd. discussed with Mr. Jarvis and James H. Lowry, Supt. of Park Dept., plans for number of swimming pools.

La., Shreveport—Plans for extensive improvement of river front here through a system of battures and the reclamation of property valued at several thousand dollars have been announced following conference of business men with Major C. E. Smith and J. R. Fordyce, former army engineers. The projected improvement, the primary object being to bring about reclamation and restoration of navigation on Red River, would cost \$1,000,000. Engineers are to make a more detailed survey and report to the business interest, after which the movement is expected to take definite shape.

Mich., Detroit—Subway communication with Detroit was proposed by Mayor E. B. Winters, of Windsor, requesting consideration of plan to construct tunnel under the Detroit River as international peace memorial. Mayor Couzens, of De-

troit, and the American Government have been asked by Windsor's mayor to assist in expediting the scheme.

N. J., Camden—Harbor Comn. has requested City Council to authorize wharf improvements bonds to amount of \$500,000.

N. Y., Niagara Falls—City Council receives recommendation for purchase of tract of land to be used as swimming pool. \$10,000 appropriated for the purpose.

O., Newport—Joseph Herman, Comr. of Pub. Wks. of Newport, was authorized to receive bids for construction of garbage incinerator in accordance with plans and specifications prepared by City Engr. This will be located in Taylor Mill Bottoms and will be convenient, not only to Newport, but to cities of Bellevue and Dayton, and will also be of sufficient capacity for the three cities. Cost will exceed \$40,000.

Ore., Portland—The Pacific Bridge Co. was again the only bidder on Columbia slough channel project. The local dredging corporation bid \$309,450. City Engr. Laurgaard's revised estimate was \$296,000. The Pacific Bridge Co. is expected to be awarded the contract at another Council session.

Ore., Portland—Council passed resolution drawn up by City Attorney W. P. LaRoche, calling for new bids on the Columbia slough channel project. The bids will be based upon revised estimate of \$321,950 filed by City Engineer O. Laurgaard.

Pa., Harrisburg—Plans presented to city for improvement of Market Sq., which call for construction of comfort stations, safety zones, drink fountains, etc.

Tex., Brownwood—City of Brownwood contemplates erection of bathing pavilion and bathhouses to cost approximately \$60,000. Plan is to have Coggins Park used as site for this resort. To the east of Coggins Park is located hot sulphur water well, and this water will be piped to Coggins Park for bath purposes.

Tex., Dallas—Construction of tunnel under Houston St. from Union Station Park to railroad tracks at Union Station was plan adopted by city. Total cost of which to be \$50,000 to \$75,000.

Tex., Houston—\$50,000 was set aside by War Dept. for draining Ellington Field, and contracts will be let by end of the month. In addition to this the Chamber of Commerce has appropriated \$25,000 to be spent in draining the bayou which overflows the field.

Tex., Sulphur Springs—Comrs.' Court ordered bond election of \$50,000 for Levee Improvement Dist. No. 2, comprising about 1,100 acres of land near Peerless, in northwest part of county.

Wash., Seattle—Street car extensions and betterments that will cost \$500,000 authorized in council bill introduced at regular session of City Council and referred to Finance and City Utilities Committees.

W. Va., Moundsville—City proposes to install crematory. Address W. G. McGlumphy.

Wis., Racine—Bd. Pub. Wks. soon receives bids building rubble mound breakwater, involving 2,500 ft. lakeshore protection. About \$225,000. P. H. Connolly, City Engr.

British Guiana—Trench digging machines and concrete sewer pipe manufacturing machines are required by engineer. Quotations should be given F. O. B.; also, it is desired to know cost of operating trench digging machines. References. (For information, write to Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to "Opportunity No. 29803.")

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fire protection to that district, has been requested of Council.

O., Struthers—Council has instructed Solicitor to prepare the necessary legislation for bond issue of \$22,000 for new system of fire protection. Bond election will be put to popular vote this fall.

O., Willoughby—The Watson Engineering Co., Hippodrome Bldg., Cleveland, has submitted preliminary sketches for proposed high level bridge on which bond issue was voted July 8.

O., Youngstown—D. E. Sweeney, City Audr., will sell bonds July 21, in the sum of \$8,500, proceeds from which to be used for purchase of hook and ladder service truck.

O., Xenia—New apparatus to be bought to complete motorization of department. Address Chmn. of City Comm.

Pa., Canonsburg—Council contemplates buying a fire truck.

Pa., Farrell—Fire station and several pieces of apparatus were recently destroyed by fire and new apparatus to be bought. Address Clk. of Council.

Pa., Oakhurst—Proposition to purchase fire apparatus. Address Clk. of Vil.

Pa., Sharon—Citizens assert that fire department has not enough apparatus for adequate protection.

Pa., Sharpsburg—Two fire trucks are to be purchased.

Pa., West Chester—Town considering purchase of fire apparatus. Address Chief Fire Dept.

Va., Richmond—Appropriation of \$148,000 has been made for motorization of the fire department. Address Chief.

Va., Richmond—Mayor Ainslie signed resolution appropriating \$148,000 to purchase motor equipment for fire department. It is expected if deliveries on new machines can be secured that department will be entirely motorized by first of the year.

W. Va., Welsh—City voted bonds of \$35,000, part for purchase necessary fire apparatus. Address the Mayor.

Wis., Eau Claire—Additional fire apparatus is to be purchased.

BRIDGES

Cal., Marysville—Plans and specifications for 10 bridges to cost approximately \$36,050 were adopted by Board of Supervisors of Yuba County. Plans were drawn by County Surveyor L. B. Crook.

Ga., Savannah—Altamaha bridge will be built, probably within the very near future. The Beasley Contracting Co., of Savannah, the Austin Contracting Co., of Atlanta, and a St. Louis firm have made a survey of a site at Sisters Bluff, and each separately submitted a bid for the job. Likely these bids will be opened in Savannah in the office of the Citizens & Southern Bank. The citizens in vicinity of proposed site of the bridge have subscribed \$75,000 and have agreed to pay in about \$45,000. The span may cost between \$100,000 and \$125,000, according to preliminary estimates.

Ind., Indianapolis—State Bd. of Tax Comrs. has approved bond issue of \$55,000 for Wayne Co. to complete bridge on National Rd. over White River at Richmond.

Ind., Richmond—Wayne Co. has authorized \$55,000 bridge bonds.

Mass., Northampton—It is planned to expend about \$18,000 for concrete bridge over Mill River. Address Clk. of Hampshire Co.

Minn., Duluth—Messrs. A. B. Leach & Co., of Chicago, were successful bidders for bridge bonds to amount of \$90,000.

Mont., Hamilton—It is planned to expend \$20,000 for bridge about 280 ft. long, over Bitterroot River, Ravalli Co. Address Co. Clk.

Mont., Thompson Falls—Sanders Co. election, Sept. 2, to vote on \$75,000 bonds to build bridges. T. Johnson, Thompson Falls, Engrs.

N. Y., Watertown—See "Streets and Roads."

O., Akron—Bond issue of \$210,000 for construction of viaduct over the Ohio Canal on State St. will probably be authorized.

O., Elyria—Bridge; \$40,000. Engr., F. P. Crosse, Court House, Lorain Co. Start plans soon.

O., Marion—Bridge and seven culverts: about \$35,000. Engr., Chas. Ash, Court House. Plans drawn.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

***Cal., Redding**—F. Rolandi, contractor on Redding-Tower House lateral, has let sub-contract for building all concrete culverts on the unit to De Waard Bros. for sum approximating \$40,000. De Waard Bros. built the concrete culverts and bridges between Redding and Grey Rocks at a cost \$27,000. In addition to \$40,000 worth of concrete work on the Redding-Tower House unit, the county will have to build 3 concrete bridges.

N. J., Elizabeth—County Engineer Bauer announced that Charles Army, of 14 High St., was lowest bidder for erection of new structural iron bridge over Rahway River, at Monroe St., Rahway. His bid was \$24,590.

MISCELLANEOUS

Cal., Waterford—Waterford Irrigation Dist. will receive sealed bids until July 12 for \$205,000 improvement bonds. J. R. Browder, Sec.

Ind., East Chicago—Park bonds of \$120,000 have been accepted.

Ind., Indianapolis—A preliminary resolution has been adopted for acquisition of 12 acres north of Fall Creek Parkway for a neighborhood park, by Bd. of Park Comrs. The Bd. discussed with Mr. Jarvis and James H. Lowry, Supt. of Park Dept., plans for number of swimming pools.

La., Shreveport—Plans for extensive improvement of river front here through a system of battures and the reclamation of property valued at several thousand dollars have been announced following conference of business men with Major C. E. Smith and J. R. Fordyce, former army engineers. The projected improvement, the primary object being to bring about reclamation and restoration of navigation on Red River, would cost \$1,000,000. Engineers are to make a more detailed survey and report to the business interest, after which the movement is expected to take definite shape.

Mich., Detroit—Subway communication with Detroit was proposed by Mayor E. B. Winters, of Windsor, requesting consideration of plan to construct tunnel under the Detroit River as international peace memorial. Mayor Couzens, of De-

troit, and the American Government have been asked by Windsor's mayor to assist in expediting the scheme.

N. J., Camden—Harbor Comn. has requested City Council to authorize wharf improvements bonds to amount of \$500,000.

N. Y., Niagara Falls—City Council receives recommendation for purchase of tract of land to be used as swimming pool. \$10,000 appropriated for the purpose.

O., Newport—Joseph Herman, Comr. of Pub. Wks. of Newport, was authorized to receive bids for construction of garbage incinerator in accordance with plans and specifications prepared by City Engr. This will be located in Taylor Mill Bottoms and will be convenient, not only to Newport, but to cities of Bellevue and Dayton, and will also be of sufficient capacity for the three cities. Cost will exceed \$40,000.

Ore., Portland—The Pacific Bridge Co. was again the only bidder on Columbia slough channel project. The local dredging corporation bid \$309,450. City Engr. Laurgaard's revised estimate was \$296,000. The Pacific Bridge Co. is expected to be awarded the contract at another Council session.

Ore., Portland—Council passed resolution drawn up by City Attorney W. P. LaRoche, calling for new bids on the Columbia slough channel project. The bids will be based upon revised estimate of \$321,950 filed by City Engineer O. Laurgaard.

Pa., Harrisburg—Plans presented to city for improvement of Market Sq., which call for construction of comfort stations, safety zones, drink fountains, etc.

Tex., Brownwood—City of Brownwood contemplates erection of bathing pavilion and bathhouses to cost approximately \$60,000. Plan is to have Coggins Park used as site for this resort. To the east of Coggins Park is located hot sulphur water well, and this water will be piped to Coggins Park for bath purposes.

Tex., Dallas—Construction of tunnel under Houston St. from Union Station Park to railroad tracks at Union Station was plan adopted by city. Total cost of which to be \$50,000 to \$75,000.

Tex., Houston—\$50,000 was set aside by War Dept. for draining Ellington Field, and contracts will be let by end of the month. In addition to this the Chamber of Commerce has appropriated \$25,000 to be spent in draining the bayou which overflows the field.

Tex., Sulphur Springs—Comrs.' Court ordered bond election of \$50,000 for Levee Improvement Dist. No. 2, comprising about 1,100 acres of land near Peerless, in northwest part of county.

Wash., Seattle—Street car extensions and betterments that will cost \$500,000 authorized in council bill introduced at regular session of City Council and referred to Finance and City Utilities Committees.

W. Va., Moundsville—City proposes to install crematory. Address W. G. McGlumphy.

Wis., Racine—Ed. Pub. Wks. soon receives bids building rubble mound breakwater, involving 2,500 ft. lakeshore protection. About \$225,000. P. H. Connolly, City Engr.

British Guiana—Trench digging machines and concrete sewer pipe manufacturing machines are required by engineer. Quotations should be given F. O. B.; also, it is desired to know cost of operating trench digging machines. References. (For information, write to Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to "Opportunity No. 29803.")

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Bituminous pavements or roads are adaptable to all conditions of traffic. They offer a resilient surface that is not injurious to horses' hoofs. They actually **improve** under the tread of heavy trucks, for the surface is only **ironed out** instead of cracking or wearing.

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OFFICIAL ADVERTISING

Pennsylvania State Highway Department, Harrisburg, Pa.—Sealed proposals will be received at the State Capitol until 10:00 A. M., July 29, 1919, when bids will be publicly opened and scheduled, and contracts awarded as soon thereafter as possible for the reconstruction of the following pavements: 36,979 linear feet of Reinforced Concrete and Hillside Vitrified Brick in Adams County; 14,481 feet of Reinforced Concrete in Beaver County; 15,207 feet of Vitrified Brick on a Concrete Foundation and Bituminous Surface Course on a Concrete Foundation in Bradford County; 32,128 feet of Bituminous Macadam Surface Course (Penetration Method) on a Telford Foundation in Chester County; 46,815 feet of Resurfacing with Bituminous Mixtures on a prepared Broken Stone Base in Chester and Delaware Counties; 18,619 feet of either One Course Reinforced Concrete and Hillside Vitrified Brick or Two Course Reinforced Concrete and Hillside Vitrified Brick in Crawford County; 18,640 feet of One Course Reinforced Concrete and Hillside Vitrified Brick in Crawford County; 49,420 feet of either Bituminous Surface Course on a Concrete Foundation and Hillside Vitrified Brick or Reinforced Concrete and Hillside Vitrified Brick in Erie County; 19,918 feet of Vitrified Brick on a Concrete Foundation in Fayette County; 25,972 feet of Reinforced Concrete and Hillside Vitrified Brick in Jefferson County; 29,628 feet of either Reinforced Concrete and Hillside Vitrified Brick or Two Course Reinforced Concrete and Hillside Vitrified Brick in Lawrence County; 24,049 feet of either Bituminous Surface Course on a Concrete Foundation and Hillside Vitrified Brick or Reinforced Concrete and Hillside Vitrified Brick in Mifflin County; 43,298 feet of either Bituminous Surface Course on a Concrete Foundation and Hillside Vitrified Brick or Reinforced Concrete and Hillside Vitrified Brick in Montgomery County; 15,898 feet of either Bituminous Surface Course on a Concrete Foundation or Reinforced Concrete in Montgomery and Bucks Counties; 25,655 feet of resurfacing with Bituminous Mixtures on a prepared Broken Stone Base in Northampton County; 53,806 feet of either Bituminous Surface Course on a Concrete Foundation or Reinforced Concrete in Susquehanna County; 11,484 feet of Reinforced Concrete in Union County; 9,480 feet of Reinforced Concrete and Hillside Vitrified Brick in Washington County; 1,106 feet of Vitrified Brick in Washington County; and 19,549 feet of Reinforced Concrete and Hillside Vitrified Brick in Westmoreland County. Bidding blanks and specifications may be obtained free, and plans upon payment of \$2.50 per set, on application to State Highway Department, Harrisburg. No refund for plans returned. They can also be seen at office of State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia, and 904 Hartje Building, Pittsburgh, Pa. Bids will also be received at the same time and place for the construction of the following Bridges: Wyoming County, Route No. 9, Nicholson Township and Nicholson Borough, triple span, 135 feet c. to c. end pins, 26 feet c. to c. of trusses, having a reinforced concrete floor system; also York County, Route No. 127, York Township, one through truss, 144 feet c. to c. end pins, 25 feet 10 inches c. to c. of trusses. Specifications will be furnished free upon request, and plans upon payment of \$2.50 per set. LEWIS S. SADLER, State Highway Commissioner.

Bids received until July 22, 1919.

Highway Work

Office of the State Commission of Highways
ALBANY, N. Y.

Sealed proposals will be received by the undersigned at their office, No. 55 Lancaster Street, Albany, N. Y., at 1:00 o'clock P. M. on Tuesday, July 22, 1919, for the improvement of the following highways:

CATTARAUGUS—One highway—4.60.
CHAUTAUQUA—One highway—4.29.
CHENANGO—Three highways—4.78, 5.57 and 5.87.
LEWIS—One highway—4.74.
ONONDAGA—One highway—0.27.
RENSSELAER—One highway—1.44.
SUFFOLK—One highway—3.85.

Also for the Completion of the Following Highways:

CAYUGA—Three highways—8.00, 6.06 and 5.45.
CHAUTAUQUA—One highway—3.90.
CHENANGO—Three highways—7.12, 7.09 and 3.06.

FRANKLIN—One highway—10.36.
NIAGARA—One highway—7.79.
OSWEGO—One highway—6.36.
SARATOGA—Two highways—6.10 and 5.74.
SENECA—Two highways—4.89 and 2.13.

And also for the Repair of the Following Highways:

ALLEGANY, SCHUYLER and STEUBEN—One contract—surface treatment.
OSWEGO—One contract—resurfacing.
SUFFOLK—One contract—reconstruction.

And also for the Completion of: (Repair Contracts)

CHENANGO—One contract—resurfacing.
CORTLAND—One contract—resurfacing.

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the division engineers in whose division the roads to be improved, completed and repaired are located. The addresses of the division engineers and the counties of which they are in charge will be furnished upon request.

The especial attention of bidders is called to "General Information for Bidders" on the itemized proposal, specifications and contract agreement.

FREDERICK STUART GREENE,
Commissioner.

ROYAL K. FULLER, Secretary.

Bids received until July 29, 1919.

Highway Work

Office of the State Commission of Highways
ALBANY, N. Y.

Sealed proposals will be received by the undersigned at their office, No. 55 Lancaster Street, Albany, N. Y., at 1:00 o'clock P. M. on Tuesday, July 29, 1919, for the improvement of the following highways:

CHAUTAUQUA—One highway—4.64.
JEFFERSON—One highway—6.78.

And also for the Completion of the Following Highways:

ALLEGANY—One highway—9.07.
CATTARAUGUS—One highway—6.98.
CAYUGA—Two highways—3.89 and 4.39.
DUTCHESS—Two highways—6.97 and 6.79.
FRANKLIN—One highway—1.99.
JEFFERSON—Three highways—4.05, 14.05 and 7.76.
LIVINGSTON—One highway—7.69.

MONROE—Five highways—2.92, 7.93, 5.27, 6.33 and 4.55.

ONEIDA—One highway—5.34.
ONONDAGA—One highway—3.06.
ORANGE—One highway—4.03.
SCHUYLER—One highway—6.03.
WAYNE—One highway—2.25.

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the division engineers in whose division the roads to be improved, completed and repaired are located. The addresses of the division engineers and the counties of which they are in charge will be furnished upon request.

The especial attention of bidders is called to "General Information for Bidders" on the itemized proposal, specifications and contract agreement.

FREDERICK STUART GREENE,
Commissioner.

ROYAL K. FULLER, Secretary.

Bids received until July 28, 1919.

Sewer Construction

ABERDEEN, S. DAK.

Notice is hereby given that sealed bids will be received by the Auditor of the City of Aberdeen, South Dakota, until 9:00 o'clock A. M., on Monday, July 28, 1919, for the furnishing of material and labor and constructing a storm sewer for the City of Aberdeen, South Dakota, at which meeting of the Board of Commissioners of said city all proposals will be opened.

All material and work must be in accordance with the plans and specifications on file at the office of the City Engineer and City Auditor.

The work to consist of approximately eight (8) miles of vitrified, segmental block or concrete pipe, running in diameter from 10 inches to 96 inches, with 100 manholes and 212 catch-basins.

Any prospective bidder desiring a set of the plans for personal use may obtain same from the City Engineer by making a deposit of ten dollars (\$10) to cover the cost of the blueprints. Refund of one-half the amount deposited will be made on the return of the plans and specifications to the City Engineer within five days following date of receiving bids.

Each bid must be accompanied by a certified check, payable to the City of Aberdeen, in the amount of one thousand dollars (\$1,000). Said check will be returned to unsuccessful bidders upon award of contract and to successful bidder when his bond has been approved for the faithful performance of the work.

The city reserves the right to reject any or all bids.

By order of the Board of Commissioners of the City of Aberdeen.

F. W. RAYMOND,
City Auditor.

Bids received until July 14, 1919.

Paving

SHENANDOAH, PA.

Bids will be received by the Borough of Shenandoah, Pa., for paving 9,500 square yards with wood block, vitrified brick, sheet asphalt, tarvia or any suitable paving material; also for covering with asphalt 3,177 square yards of old Belgian block. All bids to be in by July 14, 1919. Specifications can be seen at the office of DAVID T. GLOVER, Borough Engineer.

OFFICIAL ADVERTISING

Bids received until July 15, 1919.

Notice to Contractors

LAKE GENEVA, WIS.

Sealed proposals will be received at the office of the City Clerk of Lake Geneva, Wis., in said city, until the 15th day of July, 1919, at 4:00 o'clock P. M., for the furnishing of all material and doing all the work necessary and required to build a three-compartment sewage disposal tank and sludge bed at the old Crawford mill site in said city.

Work to be begun within ten days after the signing of the contract and completed by September 20, 1919.

Printed copies of the specifications, forms of contract, proposal and bond have been prepared and will be furnished to bidders upon application to the City Clerk.

Detailed blueprint forms, plans and cross-sections are also on file at the office of the City Clerk, where they may be inspected by bidders.

No bid will be considered unless accompanied by a certified check equal to at least five per cent. (5%) of the amount of the bid.

A good and sufficient bond will be required in an amount equal to the total amount of the bid.

The bidder must be prepared at the time of the opening of the bids to show the Council that he is fully prepared to do the work in a satisfactory manner.

Bids failing to comply with the above will not be considered. The bids will be opened

and considered by the Common Council at their rooms in said city on the 15th day of July, 1919, at 8:00 o'clock P. M.

The right is reserved to reject any and all bids.

Dated at Lake Geneva, Wis., this 1st day of July, 1919.

ALLAN E. PEACOCK, Mayor.
FRANK A. BRIEGEL, City Clerk.

Bids received until July 28, 1919.

NOTICE TO CONTRACTORS

Building of Vitrified Pipe Sewers NEW BETHLEHEM, PA.

Notice is hereby given that sealed proposals will be received by the Town Council of the Borough of New Bethlehem, Pa., at the Council Chamber in the Municipal Building in New Bethlehem, Pa., until 8:00 o'clock P. M. on Monday, the 28th day of July, 1919, for the construction, complete, of

VITRIFIED PIPE SANITARY SEWERS,

consisting of main intercepting sewer and of various lateral sewers, of sizes from 18 inches to 8 inches, with the necessary manholes, etc.

Proposals will be required to conform to the plans and specifications on file at the office of D. M. Geist, Secretary of Council, New Bethlehem, Pa., and at the offices of E. W. Hess, Engineer, at DuBois, Pa., and at Clearfield, Pa., and must be made upon the "Bidding Sheet" that will be furnished to bidders on request.

Each bidder must deposit with his bid cash or certified check, made payable to the Council of New Bethlehem Borough, in an amount equal to fifty dollars (\$50) for each section of sewer bid upon as a guarantee of good faith that he will, if a contract is awarded to him, within ten (10) days thereafter execute a written contract for the per-

formance of the same. The deposits of other bidders will be returned to them.

A bond satisfactory to the Council, in an amount equal to the contract awarded, for the faithful performance of the contract, will be required of the bidder to whom a contract is awarded.

Bids must be sealed and addressed plainly to "The Town Council of the Borough of New Bethlehem" and marked on the outside of the envelope enclosing them: "Proposal for Construction of Vitrified Pipe Sanitary Sewers."

The right is reserved to accept any or to reject any or all bids.

THE TOWN COUNCIL OF
NEW BETHLEHEM BOROUGH.

Bids received until August 5, 1919.

Notice to Paving Contractors

SHARPSVILLE, PA.

July 7, 1919.

Sealed proposals will be received by the Secretary of the Borough of Sharpsville, Pa., until 5:00 o'clock P. M., August 5, 1919 (Tuesday), for the paving of Walnut Street from Mercer Avenue to the westerly line of Covert Avenue, with brick blocks or other materials as may be selected by the Borough Council; approximately forty-two hundred (4,200) square yards.

Also for the paving of Walnut Street from the tracks of the Sharpsville Railroad northward to the northerly curb line of Shenango Street, with brick blocks or other materials as may be selected by the Borough Council; approximately eight hundred (800) square yards.

Specifications and bidding sheets may be had at the office of the Secretary, or the Borough Engineer.

The Borough Council reserves the right to reject any or all bids.

WILLIAM A. GRABER,
Secretary Borough of Sharpsville.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STREETS AND DROADS.

Ind., Evansville. 10 a.m., July 24.

Road in Knight Twp.—W. M. Copeland, Co. Aud.

Ind., Noblesville. 10 a.m., July 26.

Concrete road in Noblesville Twp.—H. O. Cottingham, Co. Aud.

Ind., Lebanon. 10 a.m., Aug. 5.

Concrete road in Eagle Twp.—C. Goodwin, Co. Aud.

Ind., Lansing. 7.30 p.m., July 14.

Paving 21,000 sq. yd. with bituminous macadam and 5,000 lin. ft. combined curb and gutter.—N. A. Nelson, City Clk.

Minn., St. Paul. 10.30 a.m., July 14.

Paving street, involving 15,141 sq. yd. 3½-in. creosoted wood blocks, 2,900 barrels Portland cement, 1,347 cu. yd. concrete sand, 2,247 cu. yd. crushed stone or gravel, 1,809 cu. yd. cushion sand, 105,987 lbs. pitch filler, 1,000 lbs. asphalt filler, 625 lin. ft. 12-in. sewer pipe, 351.7 lin. ft. sandstone curb, etc.—H. W. Austin, City Purch. Agt.

Minn., Litchfield. 8 p.m., July 16.

Grading, paving and curbing streets, involving 10,943 cu. yd. grading, 38,864 sq. yd. reinforced concrete, asphaltic concrete, or creosoted wood block pavement and 11,263 lin. ft. curbing.—F. O. Holm, Vil. Recorder.

Minn., Duluth. 11 a.m., July 30.

Paving street.—J. A. Farrell, Comr.

O., Painesville. July 14.

Paving in Perry Twp.—W. A. Davis, Co. Aud.

O., Piqua. July 19.
Road in Miami Co.—J. G. Sanders, Co. Clk.

O., Columbus. July 18.
State highway road work to cost \$2,000,000.—C. Cowen, State Hwy. Comr.

Pa., Sharpsville. 5 p.m., Aug. 5.
Paving 5,000 sq. yd. with brick block or other materials.—W. A. Graber, Secy., Boro. Council.

Ont., Owen Sound. 5 p.m., July 18.
Resurfacing 30,000 sq. yd. macadam with asphaltic concrete, part of which requires concrete base; also three mi. concrete curbs and gutters.—D. H. Fleming, Town Engr.

Ont., North Bay. noon, July 18.
14,000 sq. yd. asphalt, asphaltic concrete or bitulithic pavement, 5,600 lin. ft. curbs and gutters and 14,000 sq. ft. sidewalks widening, installing all necessary sewer connections and renewing all water services.—H. J. McAuslan, Town Engr.

Ont., Toronto. noon, July 21.
Steam shovel excavating in Pickering Twp. and on Provincial Hwy.—W. A. McLean, Deputy Minister of Hwys., Parliament Bldgs.

Que., Three Rivers. noon, July 15.
Concrete sidewalks, grading and seeding, public building.—Dist. Engr.

SEWERAGE.

Minn., St. Paul. 10.30 a.m., July 14.
Laying sewer in two streets.—H. W. Austin, City Purch. Agt.

Minn., St. Cloud. 3 p.m., July 15.
Thirty blocks 72-in. double ring or two-piece vitrified segment block sewers.—A. W. Buckman, City Clk.

Minn., Hinckley. 7.30 p.m., July 21.
General sewer, including outlet and district sewers, involving 9,850 lin. ft. 8 to 12-in. sewer with manholes, flush tanks and lampholes.—R. N. Pearson, Vil. Clk.

Ont., Harriston. July 14.
Open ditch drain in township of Minto, involving 7,932 ft. drain and 5,509 cu. yd. excavation.—W. D. McLellan, Twp. Clk.

WATER SUPPLY.

Minn., St. Cloud. 3 p.m., July 15.
8,300 ft. 8-in., 10-in. and 12-in. water mains.—A. W. Buckman, City Clk.

Minn., Frazee. 8 p.m., July 18.
Complete water works system.—R. O. Wood, Vil. Clk.

Minn., Hinckley. 7.30 p.m., July 21.
Water works system, including distribution pipe system, involving 5,270 lin. ft. 6 and 8-in. cast iron pipe, 13 fire hydrants and 11 gate valves; steel tower and tank, 100,000 gal. capacity on 100-ft. tower.—R. N. Pearson, Vil. Clk.

N. B., St. John. July 17.
Excavating and backfilling trench for laying 420 ft. 16-in. and 1,126 ft. 12-in. cast iron pipe.—City Engr.

BRIDGES.

Minn., Willmar. 3 p.m., July 15.
Pile and reinforced concrete girder bridge across judicial ditch in Burbank Twp.—G. Halvorsen, Co. Clk.

N. Y., Elmira. July 21.
Concrete and steel construction on bridge over Chemung River.—City Engr., City Hall.

STREETS AND ROADS

Colo., Denver—Eleven mi. of concrete road, 16 ft. wide, will be built from Las Cruces, N. M., southward. Estimated cost, \$275,000.

Ga., Adel—Issuance of \$250,000 of road construction bonds by Cook Co. voted. Chmn., Co. Bd. of Comrs.

Ga., Waycross—Ware Co. voted \$630,000 road construction bonds and \$70,000 of school building bonds. Chmn., Bd. of Co. Comrs.

Ia., Dubuque—City Council has ordered plans prepared for the improvement of several streets.

Ind., Shelbyville—Bids will be received until July 19 on \$15,000 bonds for improvement of highways.

Kan., Leavenworth—Election will be held July 16 to vote on issuing improvement bonds to amount of \$400,000.

La., Opelousas—A bond issue of \$500,000 was voted in this city, to be used for improvement of road in St. Landry Parish.

La., Sheldon—O'Brien Co. voted favorably on two road propositions, one to pave and other to issue bonds in the sum of \$1,500,000 for that purpose.

Mich., Petoskey—Emmet Co. will vote next fall on the issuance of bonds from \$350,000 to \$500,000 for the improvement of roads and will start a \$2,000,000 good roads program.

Minn., Moorhead—Special election will be held Aug. 5, to vote on \$125,000 bond issue for road improvements.

Miss., Yazoo City—Eden Separate Road Dist. will be improved at cost of \$55,000, including gravel road east along Yazoo City.

N. J., New Brunswick—Ordinances have been adopted for regulating, paving and also repaving of streets, involving expenditure of \$248,000.

N. Y., Niagara Falls—Supervisors voted appropriations amounting to \$260,000 for improvement of five new roads in Niagara Co. under county and town system. They are: Stone Rd., town of Hartland; Mapleton Rd., Pendleton; Gilbert's Corners-Griswold St. Rd., Royalton; Old Niagara Rd., Lockport; Slayton Settlement Rd., Royalton. Resolutions were passed authorizing Thomas M. Brennan, Co. Supt. of Hwys., to prepare plans and estimate for improvement of Riddle Rd. in Royalton and the Youngs-town-Wilson Rd. in Wilson and Porter.

Nev., Carson City—Plans being completed for construction of highway along west side of Walker Lake, which will be ten mi. long; cost, \$148,000.

N. Y., Syracuse—Bd. of Supvrs. voted Co.'s share of Bridgeport Rd. through Cicero Swamp of \$16,660. This is known as Co. Hwy. No. 1,072. Lysander got appropriation of \$10,000 to complete road in that town north to county line at Bowen's Corners, a distance of one and a half mi.

Ok., Alliance—City Council, J. H. McConnell, Dir. of Pub. Service; Chas. Silver, Aud., City Hall, will take bids about July 15 for grading, draining, curbing and paving in various streets. Wade Shindler, Engr., City Hall.

Pa., Harrisburg—State Hwy. Dept. plans much paving, bids on which are to be received during this month. There are three projects scheduled for Erie Co., two in Crawford Co. and two in Adams. Other counties represented are Bradford, Fayette, Jefferson, Lawrence and Montgomery counties.

Tenn., Maryville—Contracts will soon be let for improvement of roadway, including 82 mi. of road to be macadamized and 66 mi. of grading. The improvement will cost about \$400,000.

Wash., Lewistown—Fergus Co. will vote September 2 on proposition of issuing bonds of \$700,000 for roads.

W. Va., Keyser—Mineral Co., Elk Dist., voted \$137,000 bonds and soon receives bids building roads. E. Smith, Piedmont, Engr.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

***Ia., Creston**—Contract awarded The Great Western Paving Co., of Chicago, Ill., for 20,043 yds. sheet asphalt paving on 4-in. concrete base, at \$3.37, and 16,510 ft. combined curb and gutter 42 in. wide over all, at \$1.60. Also contract awarded Leckliter-Davis Construction Co., of Corning, Iowa, for 9,387 yds. of 3-in. brick paving, asphalt filled on 5-in. concrete base, at \$4.09, and 5,000 ft. combined curb and gutter, 30 in. wide over all, heavy type, at \$1.60.

***Ia., Elliott**—Contract awarded the Mid-West Paving Co., of Des Moines, Ia., for 26,433 yds. asphalt concrete pav-

ing on 4-in. concrete base, at \$3.17; 2,050 ft. combined curb and gutter, 42 in. wide over all, at \$1.47, and 17,489 ft. combined curb and gutter, 42 in. wide over all, at \$1.45.

***Ia., Tabor**—Contract awarded Leckliter-Davis Construction Co., of Corning, Ia., for 21,688 yds. of 3-in. brick paving, asphalt filler on 4-in. concrete base, at \$3.91, and 7,788 ft. combined curb and gutter 42 in. wide over all, at \$1.67.

***Ia., Villisca**—Contract awarded Akin and Flutter, of Corning, Ia., for 6,300 yds. of 3-in. brick paving, sand filler on 4-in. concrete base, at \$3.60; 26,000 yds. asphaltic concrete paving on 4-in. concrete base, at \$3.15; 20,611 ft. combined curb and gutter, 42 in. wide over all, at \$1.47, and 3,452 ft. 6 in. x 18 in. curb at 75 cents.

***Neb., Omaha**—The first contract is for 80,665 cu. yds. of grading on Lincoln Hwy. It involves both excavating and filling. Contract was awarded J. E. Turner at 38 1/4 cents per cu. yd., total price being \$30,854.36. This entire cost will be paid by federal and state governments.

***N. Y., Niagara Falls**—Bd. of Supvrs. awarded John F. McKinney Corporation, of this city, contract to pave east half of Sugar St., a distance of 1 1/4 mi., at bid of \$42,460.26. The new road will be concrete.

***Pa., Harrisburg**—Following bids were opened July 8 and several contracts have been awarded: Bradford Co., North Towanda Twp., Routes 212 and 287, 45,051 ft., either bituminous surface course and hillside vitrified brick on a concrete foundation or reinforced concrete: MacArthur Bros. Co., 120 Broadway, New York City, N. Y., \$443,080.36; Towanda Construction Co., New Albany, Pa., \$434,985.20; Keystone State Construction Co., Franklin Bank Building, Philadelphia, Pa. (Class A), \$548,093.43.

Bucks Co., Plumstead and Bedminster Twp., Route No. 156, 14,883 ft., either bituminous surface course on a concrete foundation or reinforced concrete: Manwaring & Cummins, Inc., 5600 Germantown Ave., Philadelphia, Pa., \$111,875.55; James McGraw Co., 1010 Commercial Trust Bldg., Philadelphia, Pa., \$117,643; Ambler-Davis Co., Harrison Bldg., Philadelphia, Pa. (Class B), \$147,788.40.

Butler Co., Center, Clay and Brady Twp., Route No. 73, Sections 3 and 4, 41,673 ft. reinforced concrete and hillside vitrified brick: Chas. Winters Construction Co., Renfrew, Pa., R. F. D. No. 2, \$353,296.25 (total may be subject to correction); Atlanta Construction Co., Atlanta, N. Y., \$401,559.90; Samuel Gamble Co., Glass St., Carnegie, Pa., \$451,694.25. Centre Co., Ruth Twp., Route 57, Sec. 1, 12,355 ft., either bituminous surface course on a concrete foundation or reinforced concrete: Geo. I. Thompson & Co., Clearfield, Pa., \$125,772.35.

Clearfield Co., Sandy Twp., Route No. 60, Sec. 1, 13,027 ft. reinforced concrete and hillside vitrified brick: The Foundation Co., 223 Broadway, N. Y. City, \$138,587.40.

Clinton Co., Castanea Twp., Route 23, Sec. 1, 2,903 ft., either bituminous surface course on a concrete foundation or reinforced concrete: *The Foundation Co., 223 Broadway, N. Y. City, \$28,842.20.

Delaware Co., Chester and Middletown Twp., Route 132, 24,900 ft., either bituminous surface course on a concrete foundation and hillside vitrified brick reinforced concrete and hillside vitrified brick: *Union Paving Co., 30th and Locust Sts., Philadelphia, Pa. (Class A), \$175,749.80; John F. Shanley, Jr., 605 Lincoln Bldg., Philadelphia, Pa., \$181,303.45; Ambler-Davis Co., Harrison Bldg., Philadelphia, Pa. (Class B), \$247,973.30.

Fayette Co., Georges and Springhill Twp., Route No. 116, Sec. 2, 30,197 ft. reinforced concrete and hillside vitrified brick: Brooke & Cornish, 620 Fayette Title & Trust Bldg., Uniontown, Pa., \$319,201.02; *Mason & Hanger Co., Inc., Chambersburg, Pa., \$304,482.50; Crossan Construction Co., 710 Land Title Bldg., Philadelphia, Pa., \$355,324.04.

Lehigh Co., North Whitehall and Washington Twp., Route 163, Sec. 1, 30,079 ft. reinforced concrete and hillside vitrified brick: Aronberg & McDonald, 313 Citizens Bank Bldg., Norfolk, Va., \$314,566.09; Geo. H. Hardner, Allentown, Pa., \$248,308.12; John F. Shanley, Jr., 605 Lincoln Bldg., Philadelphia, Pa., \$239,611.81.

Lehigh Co., Salisbury Twp., Route 158, Sec. 1, 16,218 ft. reinforced concrete: Hamilton-Kapnek Construction Co., Inc., 1363 Ridge Ave., Philadelphia, Pa., \$97,231.42; R. S. Rathbun Contracting Co., 409 Vine St., Bethlehem, Pa., \$112,710.88; Granville Hahn, Slatington, Pa., \$149,582.40.

Luzerne Co., Dallas, Lehman and Lake

Twp., Route 177, Sec. 1, 22,705 ft. reinforced concrete and hillside vitrified brick: Hamilton-Kapnek Construction Co., Inc., 1363 Ridge Ave., Philadelphia, Pa., \$163,620.35; Richardson Hand, Wilkes-Barre, Pa., \$166,713.73; Davis & Parry, 19 Union St., Dorranceton, Pa., \$183,830.55.

Somerset Co., Ellick Twp., Route 51, Sec. 3, 10,554 ft. reinforced concrete and hillside vitrified brick: B. J. Lynch & Co., Inc., Meyersdale, Pa., \$92,904.72.

Somerset Co., Brothers Valley and Summit Twp., Route 51, Sec. 2, 37,785 ft. reinforced concrete and hillside vitrified brick: *Harrison & Co., Inc., Derry, Pa., Westmoreland Co., \$410,240.80; Winston & Co., 240 Tair St., Kingston, N. Y., \$438,316.24; Aronberg & McDonald, 313 Citizens Bldg., Norfolk, Va., \$595,683.84.

Somerset Co., Jennertown Boro., Jenner Twp., Route No. 317, Sec. 1, 32,024 ft. reinforced concrete and hillside vitrified brick: Woy Brothers, Somerset, Pa., \$292,427.90; Trimpey & Whipkey, Casselman, Pa., \$304,582.95; Harrison & Co., Inc., Derry, Pa., Westmoreland Co., \$341,984.40.

Sullivan Co., LaPorte Twp., Route 17, Sec. 1, 17,412 ft., either bituminous surface course and hillside vitrified brick or reinforced concrete: R. D. Richardson Construction Co., 828 Connell Bldg., Scranton, Pa., \$153,314.69; T. L. Evans Sons, 344 Ferry St., Danville, Pa., \$196,513.75; Valley Construction Co., Athens, Pa., \$169,789.40.

Susquehanna Co., N. Milford and Bridgewater Twp., Route 9, Sec. 1, and Route 10, Sec. 2, 30,335 ft. reinforced concrete: E. W. Folley Contracting Corp., 34 Vine St., N. Y. City, \$232,876.90; Mathias Stipp & Son, Scranton, Pa., \$223,673.10; Warren-Moore & Co., Colonial Trust Bldg., Philadelphia, Pa., \$377,456.78.

Tioga Co., Richmond and Covington Twp., Route 21, Sec. 2, 28,831 ft., either bituminous surface course on a concrete foundation and hillside vitrified brick or reinforced concrete: Atlanta Construction Co., Atlanta, N. Y. (Class "B"), \$277,258.91; *Warren-Moore & Co., Colonial Trust Co. Bldg., Philadelphia, Pa., \$267,467.53.

Westmoreland Co., Derry Twp., Route 68, Sec. 1, 32,047 ft. reinforced concrete and hillside vitrified brick: Booth & Flinn, Ltd., 1942 Forbes St., Pittsburgh, Pa., \$362,283.86.

Wyoming and Lackawanna Counties, Clarks Summit, Glenburn, Dalton and La Plume Boroughs, and Abington, Clinton and Nicholson Twp., Route 9, 71,063 ft., either bituminous surface course on a concrete foundation or reinforced concrete: Keystone State Construction Co., Franklin Bank Bldg., Philadelphia, Pa. (Class "A"), \$593,524.99; The Gaylord International Engineering and Construction Co., Cedar and Orchard Sts., Scranton, Pa., \$447,666.34; R. C. Ruthven, 213 Carter Bldg., Scranton, Pa. (Class "A"), \$437,531.52.

York Co., Spring Garden, York and Springfield Twp., Route 127, Sec. 1, 32,744 ft. reinforced concrete and hillside vitrified brick: Ambler-Davis Co., Harrison Bldg., Philadelphia, Pa., \$452,190.60; Quinlan & Robertson, Inc., Hamburg, Pa., \$279,018.93; Wm. H. Goll, trading as Jno. Goll & Co., 1539 Filbert St., Philadelphia, Pa., \$254,387.53.

SEWERAGE.

Fla., Okeechobee—Issuance of \$45,000 municipal bonds for constructing sewer and water works systems was voted. D. E. Austin, Mayor.

Ia., Dubuque—City Council has ordered plans prepared for construction of sewers in several streets.

N. J., Garwood—Boro. Council passed ordinances for building of sewers in South Ave. and in Oak St.

N. Y., Lake Placid—Sewer; \$20,000; Main St. Engr., H. Hull, Saranac Lake, N. Y. Frank Herb, Ck., Vil. Hall. Contemplated.

N. Y., Rochester—Plans are ready for new sewerage disposal plan. A pumping station will be part of equipment.

Pa., Allentown—Sanitary sewers and disposal plant; \$1,500,000. Engr., H. F. Bascom, 628 Linden St. John Allen, Supt. of Sts. and Pub. Impvts., 628 Linden St. Plans drawn. Will soon take bids for disposal plant and building.

Pa., New Brighton—Sewerage disposal plant; \$120,000. Engr., R. Winthrop Pratt, 705 Hippodrome Bldg., Cleveland. Frank C. O'Rourke, Boro. Secy., New Brighton. Drawing plans.